AUTOMOTIVE INDUSTRIES
THE AUTOMOBILE

Reg. U. S. Pat. Off.

Volume 67 Number 16

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Automotive Industries
GEO. D. ROBERTS
Advertising Manager

Cable Address ..... Autoland, Philadelphia
Telephone ..... Sherwood 1424

OFFICES

New York—U. P. C. Bldg., 239 W. 39th St., Phone Pennsylvania 6-0080
Chicago—367 West Adams St., Phone Randolph 9448
Detroit—710 Stephenson Bldg., Phone Madison 2090
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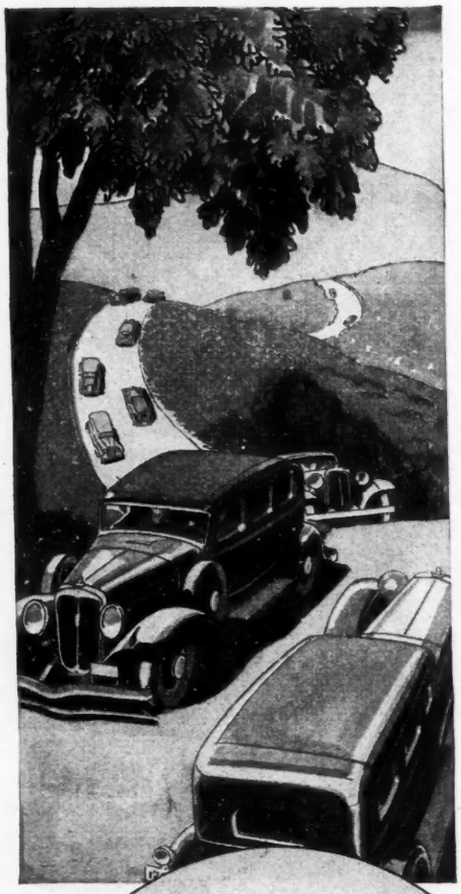

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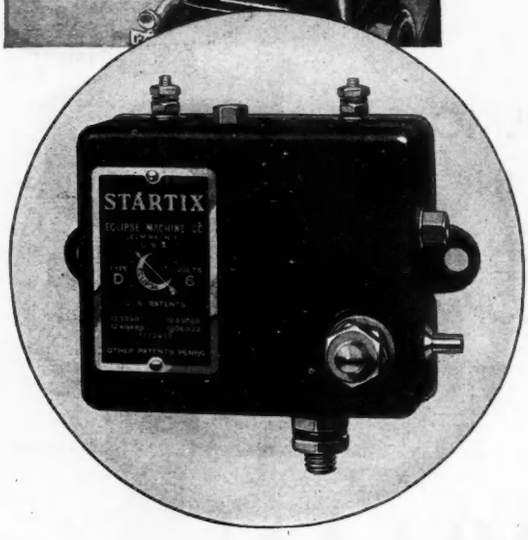

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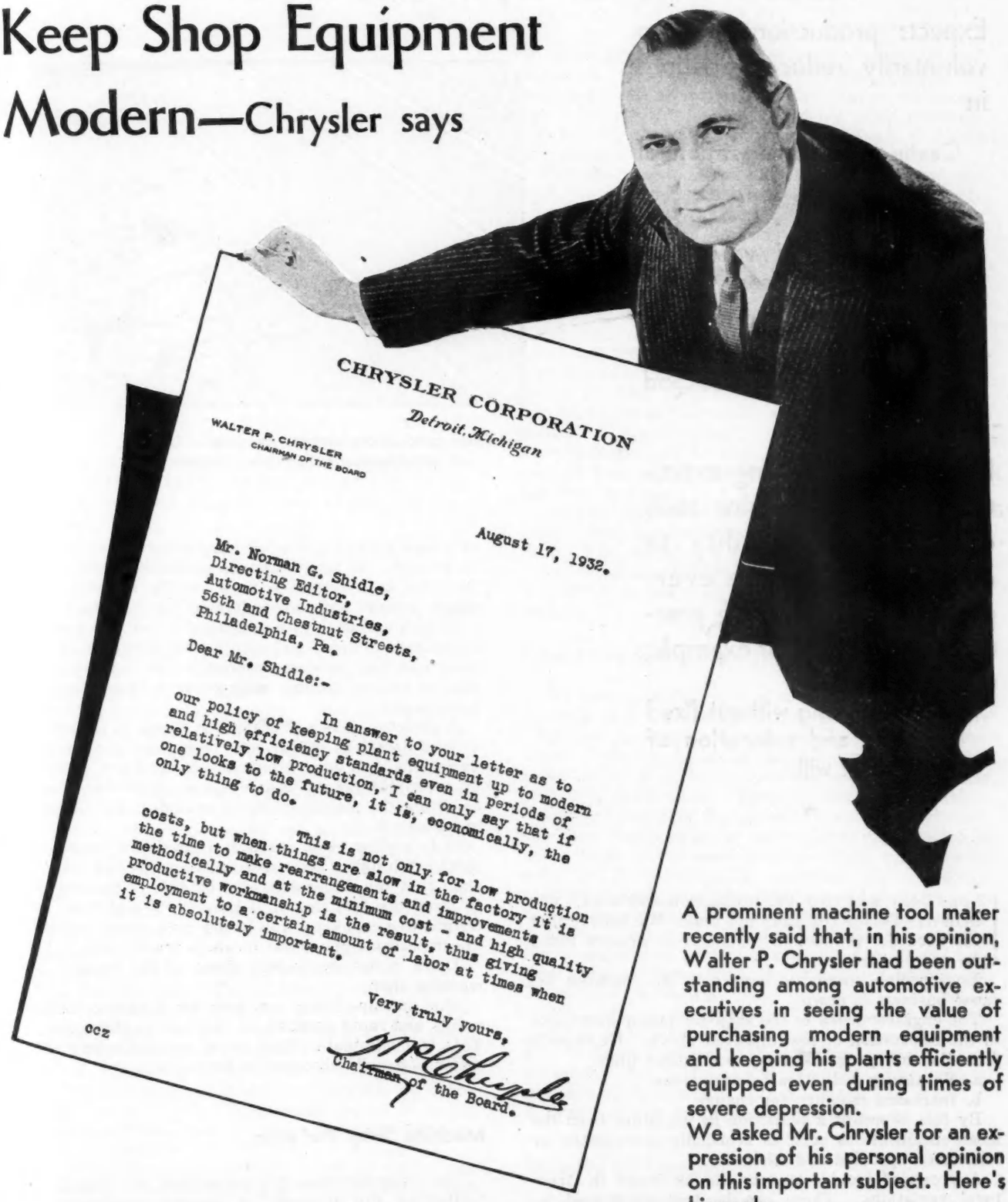
Keep Shop Equipment Modern—Chrysler says



CHRYSLER CORPORATION
Detroit, Michigan

WALTER P. CHRYSLER
CHAIRMAN OF THE BOARD

August 17, 1932.

Mr. Norman G. Shidle,
Directing Editor,
Automotive Industries,
56th and Chestnut Streets,
Philadelphia, Pa.

Dear Mr. Shidle:-

In answer to your letter as to our policy of keeping plant equipment up to modern and high efficiency standards even in periods of relatively low production, I can only say that if one looks to the future, it is, economically, the only thing to do.

This is not only for low production costs, but when things are slow in the factory it is the time to make rearrangements and improvements methodically and at the minimum cost - and high quality productive workmanship is the result, thus giving employment to a certain amount of labor at times when it is absolutely important.

Very truly yours,

Chairman of the Board.

ccz

A prominent machine tool maker recently said that, in his opinion, Walter P. Chrysler had been outstanding among automotive executives in seeing the value of purchasing modern equipment and keeping his plants efficiently equipped even during times of severe depression.

We asked Mr. Chrysler for an expression of his personal opinion on this important subject. Here's his reply.

Manufacturing Economy
Specialist and Factory

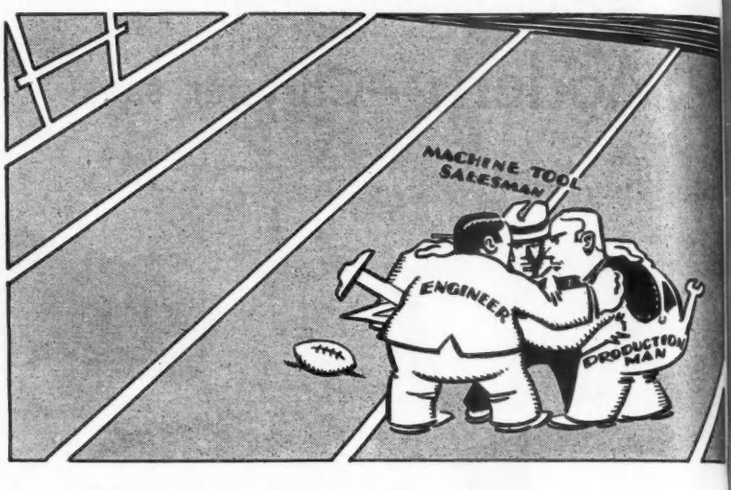
The engineer—

Expects production men to voluntarily reduce variations in

- Castings and other structural units
- Bearing areas
- Concentricity of valve-stem guides and bosses
- Crankshaft, crankpin index and radius
- Weight of crank rods and pistons

Hopes manufacturing executives will buy machine tools designed with facility to change to meet the ever-progressing engineering practice and produce, for example,

- Cylinder-boring without fixed centers and relocation of dowels at will



Frequent production fumbles are caused by lack of coordination before play begins

IT has been said that the production specialist's day is over. This is certainly not true. We believe that the need for production ingenuity is greater today than ever before.

Engineering standards have gone up—perhaps because business is down.

The engineer looks to the shop for major assistance in the realization of his improved ideals. He expects from the shop progress along two distinct lines.

a. Voluntary reduction in variations.

b. Increased mobility for change.

By this is meant a reduction in variation from the mean specifications such as is usually represented by tolerances, specified and otherwise.

A group of trouble makers can be found in structural variations. These can be best illustrated by considering a crankcase and cylinder block. The walls of these units vary in thickness approximately 3/64 of an inch. If this allowance is included in the specifications as a tolerance it is usually all plus, which means weight, and somebody must pay for the iron.

If this variation is not allowed for in the specifications then we must deal with a possible weakness. This weakness may produce resonance and roughness, and this is not in keeping with current engineering requirements.

A structure like a crankcase is bound to incorporate critical locations which are super-sensitive to metal variations. A good crankcase is carefully developed or, we might say, calibrated like a carburetor in order to obtain the maximum structural effect for the minimum weight.

It is useless to go through a crankcase with a fine tooth comb unless some assurance can be had from the shop that the dimensions can be held. When we bear in mind the fact that it is possible to add 3 per cent weight to a crankcase for 40 per cent structural gain, the importance of variation can be readily seen.

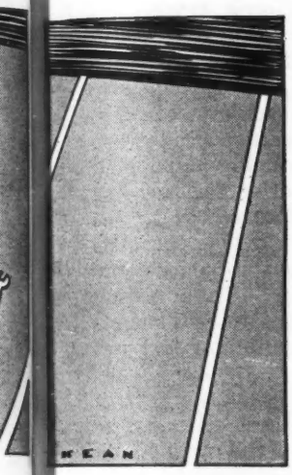
These variations include those of the foundry and machine shop.

The machine shop can help by accurate location points and rapid check-up of castings as they come in. This will eliminate piling up of unsatisfactory shock which is usually absorbed in production.

Machine Shop Variation

The characteristics of a powerplant are largely controlled by the accuracy of centers, roundness and straightness of cylinder, crank and camshaft bores.

Demands Huddle of Engineer, Tool Head Before Design is Completed



by Alex Taub*

Considerable progress has been made along these lines. However, if the most is to be made of every square inch of bearing area more attention must be given to the variations at these points. Engineering decisions are based upon tests of various kinds, and if the manufacturing variations are not discounted trouble may follow. If the variations are large the effect of the investigation is lost.

Concentricity of Valve Seats

Another important variation that gives considerable field trouble is the concentricity of valve stem guide and bosses with the valve seat throat. Eccentricity here will give poor valve life, and generally a performance below par. I believe that there is room for tool development at this point. This improvement would be as far-reaching in its satisfaction as it has been annoying to the field as well as to the engineer.

The shop appreciates quiet tappets, and, although concentric valve seats are not a cure-all, it is impossible to develop a good quieting ramp on the camshaft if the valves are "acting up" on the seats. Here is an opportunity for the machine tool maker to point the way with new tools or methods for more concentric valve seats. This means quieter, smoother engines and maximum power for a longer period, an outstanding opportunity for more RESULT PER DOLLAR.

Variations in the crankshaft are sources of concern to the engineer. The crankshaft is literally infested with tolerances to cover manufacturing variations and still more that are not listed. No doubt as of today the specified variations are necessary. However, what improvement can we expect? Are you doing anything about straight journals on crank pins and mains? What about smoothness of finish, and what is being done to reduce the required tolerance on diameter?

Crank pin index and radius. What is being done to narrow down variations here? This point is today the outstanding element in heavy corrections for out-of-balance. Sometimes we note heavy grinding on cheeks, all out of proportion to forging variation. This takes time and may weaken the shaft structurally, and because of the time involved tends to create shop demand for wide tolerance for balance.

With the proper cooperation between engineer and forge plant, arrangement may be made whereby the crankshaft forging will be ideal for balancing. However, no forging compensation can be made for position error in crank pins. This point is another opportunity for the machine tool man to show what he can do.

A better understanding of balance for crankshaft is required. Today cranks are being held to ½ in. oz. out-of-balance, and this is very good, but the important point is, where is the out-of-balance? The shaft, though checking to ½ in. oz. out-of-balance, may actually be 24 times this much out-of-balance under operation if consideration is not given to position of out-of-balance and a couple permitted to exist. Increased tolerance for out-of-balance is preferred to incorrect position.

The engineer and forge shop may collaborate to the point where all forgings are heavy in the desired plane. This would still mean nothing if crank pin position error is permitted. It takes very little position error of the pins to create considerable out-of-balance.

Pistons and Connecting Rods

The reciprocating parts of an engine are respected by shop and engineer but, like the crankshaft, are smothered in tolerances with resulting weight variations. Selective assembly is the present way out. However, what is being done to bring all rods and pistons to one weight? There is a need for automatic weighing equipment that is easy to use that will indicate how much must be taken from each piston to bring them to the same weight. This will leave us with the fit variation for selection only. Likewise connecting rods should be designed and manufactured to a uniform weight so that any rod may fit any engine in the field and shop. Of course, this means maintaining consideration of interchangeable fits. Rods have been made uniform from the standpoint of fit; now let us have the weight.

We could go through every piece of the car and question as to what is being done to lower tolerances. For instances, spline shafts are an endless source of trouble due to tolerances required under present methods of fabrication. What will you do about it? It is easy to ask, but no doubt difficult to execute.

Mobility for Change

To change with the trend is second only to creating the trend. To do either we must be able to make

* Paper read at the S.A.E. Production meeting in Buffalo, N. Y., October 3, 1932.

changes without the tremendous expense of the immediate past.

The greatest obstacle to mobility to change is expensive tools. We do not mean by this that high-grade machine tools cannot be used. There can be no return to the file and solder iron. We do mean, however, that large tools and small tools must be designed with facility for change.

One of the most horrible examples is cylinder-boring equipment with fixed heads. In the past few years, as you know, the reamer has been applied to the engine of our industry, and in most cases the larger bore was obtained without change in bore centers. Reduction in water passage was the result, with its many evils for foundry and field. Uneven cooling of bores which follows will give trouble throughout the life of the car. It breeds blow-by and hot oil, compression leaks and power loss, worn rings and bad oil consumption. Such an engine may be bigger, but it certainly is not better. *However, the centers have been saved.* Fixed center machinery is to blame. We must have rugged accuracy without fixed centers.

This principle applies throughout. Progress may demand the shifting of one hole in a group. Fixed center machinery may make the change prohibitive or at least costly. A product is continued through production unsatisfactory at some point because of the cost of changing. This does not mean that we must go back to the single-spindle machine. It calls for equipment with adjustable centers without sacrifice of accuracy.

Location Holes

Location holes for positioning the product in the jigs are necessary. But suppose that these dowel holes are in such a location that a needed change would require they be moved a little. Today in some shops that would be a catastrophe. It would affect every jig in the cylinder-block line. Why should this be so? Location dowels should be incorporated in fixtures in such a manner that they can be moved or firmly fixed at the will of the shop.

The mental attitude of the shop to change in machining methods to facilitate product change is worthy of mentioning. It may be necessary to increase rigidity of a crankshaft which may require cheeking. With a shop that is not cheeking the crankshaft we find considerable protest. It is difficult and an unsatisfactory operation. Why? Probably because the proper tools are not available, or the sequence of operations would be disturbed. The shop is entitled to its "rathers," but shop habits must also undergo development in mobility to change.

Quite often good engineering ideas or principles are doomed because they can't be made economically if at all. But this is the day of new ideas. If competition is the life of trade, new ideas are the lifeblood of competition.

It has been suggested that the engineer call in the machine tool specialist to collaborate on designs while still liquid. This might lead to the successful production of an item heretofore considered beyond redemption.

I wonder what our associates in the production department would do if the engineer told them how to do their job, or where to go to buy machine tools. Yet new ideas must be given consideration even when apparently impractical from the producing standpoint. The outside specialist with his incentive for new tool sales should be brought into the picture, but by the shop. Rather than discard a new thing, the shop should pass the problems out among the various concerns in whom they have confidence. Thus casting our bread of new ideas upon the waters of machine tool genii may result in a return other than just wet bread.

We have asked for a *voluntary decrease in variations* and *improved mobility to change.* These must not be conflicting requirements. One without the other would be insufficient. Appreciation of each of these elements exists today. However, they need more consideration, particularly when new appropriations are in the offing for new or changed products. If new investments are in order, let us give consideration to these principles. Who knows but that the promotion of these very principles may help the appropriations along.

It has become increasingly evident that intimate contact between shop and engineering department is needed to build the proper appreciation of each other's problem. It is essential that the engineer know his shop and shop man, in order to temper his suggestions to conditions prevailing. It is just as vital that the shop man be intimate with engineering test results, in order that he might see the parts he is producing in the light of their functioning. Test results or even seeing tests conducted may influence valuable suggestions as to improved design that will be *easily produced good.*

Bureau of Standards Studies Effect of Coatings on Steel

AN air brake for trucks and trailers, also applicable to passenger cars, having a compressor operated by manifold vacuum and brake cylinders mounted directly on the brake backing plates, has been placed on the market recently by the Automotive Air Brake Corp. of Detroit.

The system, for a truck and trailer installation as shown in the accompanying layout, consists of the air compressor, storage tanks, a foot pedal operated metering valve in the main line from the tank or tanks, a three-way fitting leading to (1) the master cylinder for the tractor and (2) to the trailer. On the trailer the operating cylinders are mounted directly on the brake backing plates. For the tractor unit, the master cylinder is of course connected to the rocker shaft.

The compressor is of the double-acting, slow-speed type. Its air intake is from the engine sump, thereby insuring automatic lubrication of the unit. It is designed to operate at a predetermined pressure, and will shut off automatically when the pressure in the storage tank is equivalent to or greater than the pressure exerted on the working head.

Since the manifold vacuum for operating this compressor is greatest when the butterfly valve is closed, it will readily be seen that maximum pressure is available while going down hill. Since the air intake is from the engine sump, at the rate of 77 cu. in. per piston stroke, the air compressor also acts as a crankcase ventilator, returning excess vapor and air to the engine manifold.

Operating cylinders are large, resulting in a pressure required for usual service applications of only approximately 10 to 20 lb. per sq. in.

JUST AMONG OURSELVES

Production Activity Starts in Detroit

DETROIT Section of the S. A. E. has just started a new Production Activity under the chairmanship of V. P. Rumley, It held its first meeting on Oct 10 with William F. Wise, Ex-Cell-O sales manager, talking on precision boring.

Development of this special activity by the big Detroit Section is just about as important and constructive a move as has taken place in the S. A. E. for a long while. Here in the center of automotive manufacturing, practical factory men will have ready chance to meet each other every month, talk intimately about detailed as well as broad problems, and thus get regular benefits from Society affiliation which hasn't been possible before.

By training, by type of daily activity and by inclination the average manufacturing man finds participation in group activities harder than does the average design engineer; general and sales executives, of course, are sometimes thought to be too prone to calling a meeting or conference as a prerequisite to action. Nevertheless—or perhaps for these very same reasons—the average production man has a personal need for technical association activity which is greater than anyone's else. It looks as though the Detroit Section were all set to supply that need in a real way.

Detroiters Can Yawn Among Intimates

PRODUCTION meetings will be monthly as will body and general engineering sessions at the Detroit Section under its new plan which calls for simultaneous meetings of special divisions at each section meeting. The new scheme, which we believe has interest for everybody in the industry, is described in the October issue of the Section's *Supercharger* by somebody who knows how to write interestingly about commonplace subjects. The article isn't signed, so we don't know who wrote it. Anyhow, he says:

"Rip (E. P. Rippinggille, of the Accessory Group Executive Staff, G. M. C. and new chairman of the Detroit Section) and his governing board, in keeping with the times, have a new program to offer. MORE FOR THE TIME SPENT.

"No longer need a body man yawn his way through an engine meeting or stay home. No, sir. Rip and the boys have arranged that he may now yawn among his intimates. We shall not have a meeting devoted to one activity, but all activities will program at, on or during the same evening. Thus instead of de-sexing every meeting in order to establish the broadest interest, each activity will have its own meeting, which meeting may be as technical and to the point as members of the various branches may demand.

"We will meet at the old stamping ground, the Book, and Rip will start us off with a better dinner for less money and a characteristic talk. He will then send us on our way to the particular meeting place of the activity that interests us."

Here's wishing the Detroit Section the success it seems sure to have with this constructive new program in general and with its budding production activity in particular!

Royal Host at Royal York

CANADIAN S. A. E. Section was host to the National Transportation Meeting of the Society last week—and we mean HOST. With two Canadians on the Council of the S. A. E. this year—C. E. Tilston, chief engineer, Willys-Overland of Canada and A. S. McArthur, general superintendent, Toronto Transportation Commission — our Northern neighbors seemed bent on showing everybody how a most effective business meeting can be combined with a stimulating, friendly visit. (We don't mean what you're thinking about either!)

Certainly they succeeded. Engineers who had never been to Canada before or who had visited there only once were made to feel as though they were coming home when they arrived. On behalf of ourselves and our fellow U. S. visitors we thank the Canadian Section.—N.G.S.

Flexibility Keynote of

Cemented Carbide Tooling, Die Casting Practice, Equipment Policies, Hydraulic Presses, Precision Grinding, were subjects of consideration

by Joseph Geschelin

ONE of those rare occasions when designers and production men come to grips on mutual problems, was offered by the S. A. E. Production meeting at the National Metals Congress, Buffalo, last week. All in all it was a highly successful session largely because of the cooperation of the Buffalo section, particularly M. Thorne, Fred A. Cornell, and Ralph F. Peo.

Probably the livest topic was found in the papers prepared by Alex Taub and L. F. Maurer on the role of manufacturing equipment in the present scheme of things. There is a basic philosophy back of both papers which reflects the thinking of men on different sides of the fence—one an outstanding engineer, the other a production executive of high standing.

Alex Taub's paper, which is published in full elsewhere in this issue, shows how much the machine tool builder could help the designer in the conception of advanced ideas. Of what avail is the creative ability of engineers if their planning and thinking is handicapped by the limitations of the manufacturing equipment in their production department? Faced with the necessity of reducing costs, cutting weight, etc., the engineer could work it all out if he had something different in production equipment.

It is proposed, therefore, that there should be some way of getting the designer and machine tool builder together while the design is still liquid and work out something at that stage of the game.

Obviously, this proposal doesn't change the fundamental status of the production department. In fact this would be a good time for the factory executives to sit in and contribute their ideas. And finally the actual selection of equipment as well as its sources still would rest with the factory.

Mr. Maurer shows the other side of the picture, the situation of the factory working under present economic conditions. His paper, "Manufacturing Equipment Required to Meet the Designer's Needs," brings out an important requirement of manufacturing equipment, namely, the need for flexibility.

Flexibility assumes a fundamental importance. Although the place of specialized machines for certain operations is recognized and secure, there is a need for the so-called unit type machine which may be altered at will to suit design changes. In this respect both the designer and production man are in agreement. Both ask for the abolition of fixed center machines that prohibit the desired changes in the disposition of cylinder bores, bearings, or valves.

Here is a fertile field for rugged, single-spindle machines with interchangeable heads for boring, reaming, drilling, and the like. It places peculiar significance upon the work that has been pioneered by several organizations in the industry.

That the present equipment is inadequate to meet the immediate needs of the designer is evident from the following recommendations made in Mr. Maurer's

# of Shop Equipment Is the Metals Congress at Buffalo

paper. It is interesting to note how closely they follow the very needs expressed by Mr. Taub. So it seems that there is a definite market for much essential equipment even in these times of reduced factory budgets.

"I would like to call your attention to several articles written by A. F. Denham, and published in *Automotive Industries* recently, dealing with the method of contact between the machine tool industry and the car designer and producer, and I believe much good would come from a closer contact and interchange of ideas," said Mr. Maurer.

"It is always dangerous to prophesy, as it is so easy to be wrong, but it is probable that in the next five years we may see rather radical changes in the automotive industry, some of which may even threaten the existence of present manufacturing methods. Consequently it should be mutually profitable for a very close contact between the two industries, the machine tool builder would have time to prepare designs of equipment and the car builder would receive better machines when they were needed.

"Some of the improvements in tooling, equipment and methods that are being looked for by the designer.

"1. Less costly means of changing center distances and number of spindles in multiple drilling and tapping machine.
"2. Greater ease in changing centers and number of spindles without loss of accuracy and rigidity in cylinder boring equipment.
"3. Greater ease in changing over milling equipment.
"4. Improved method of finish boring cylinder to closer limits.
"5. Improved methods of finishing small diameter holes in both cast iron and steel.
"6. Equipment for cheaply producing hardened steel cylinder liners.
"7. Equipment to more cheaply produce high carbon rolled steel brake drums.
"8. Further improvement in the production of quiet gears.
"9. Improvement in concentricity of valve seats with valve guides—a very vital thing for performance and quiet operation.
"10. Improved method of holding connecting rod forging to uniform weight.
"11. Machining pistons and connecting rods to uniform weight with an automatic weighing device.
"12. Methods and equipment for producing welded chassis frames. This is a combined engineering, equipment and cost problem, but if solved would aid in securing frame rigidity.
"13. Last, but not least, of this list of desired improvements are ways and means of reducing the cost of body and chassis sheet metal dies."

Both papers aroused some very lively discussion on the floor. Among those contributing to this discussion were M. A. Thorne, R. E. W. Harrison, F. A. Cornell, R. W. A. Brewer, and L. P. Saunders.

That much progress has been made in the utilization of sintered carbide tools was brought out in a very instructive way by Roger D. Prosser in his paper, "Current Applications of Cemented Carbide Tooling," which

National Metal Exposition

Excellent display and many new items of equipment drew a large crowd to the National Metal Exposition (14th year). It wasn't local attendance by any means because we spotted many a man from a Detroit or Cleveland factory.

Space simply forbids any detailed account of the exhibits except for a brief mention of a very few high spots. For instance, Bausch & Lomb showed for the first time their newly developed large Littrow quartz spectrograph which was described in Automotive Industries just a few weeks ago. A new type of gas cutting machine with a rolling head that follows any profile laid on its table, was shown by the Weldit Acetylene Co. of Detroit. It is said to be very thrifty in its use of gas.

Blakeslee of Chicago, old line builders of washing machines, has brought out a line of degreasing machines in a wide range of sizes. They now use a chlorinated solvent called Blacosolv. International Nickel is talking about a new nitriding steel containing nickel. The case is somewhat softer, but the core is much tougher and stronger.

New Jersey Zinc, as usual, is doing the job in a big way. You can learn almost anything you want about zinc and its uses by easing through their booth. D. A. Stuart had a fine setup to show how their E-P lubricant and cutting oils stand the gaff. They used a Mougey machine for the purpose.

Color there was in a big way. Batteries of welders here and there supplied the pyrotechnics. Then, around the fringes, the gas furnace people, of whom there were plenty, set out exposed gas jets spurting flame. Just too bad if anyone happened to lean his pants against a couple. To cap the climax, the steel people set out their polished stainless sheets that reflected the powerful light in the manner of fine mirrors.

was supplemented by slides showing new tooling on various machines. Perhaps the most important message is that concerning the development of special grades of carbides for specific metal cutting needs.

No longer need we depend upon a single grade for the endless variety of machining operations. This is probably the most important development since the introduction of this new tool material.

Two grades are of great interest to production men—Widia "L-31" for long life and fine finish on light work, and Widia "X" for machining steel. The former also is recommended for use on service equipment such as cylinder reboring machines.

In line with the present need for cutting the cost of tools, Mr. Prosser showed a Krupp film illustrating the correct method of brazing and grinding carbide tools in the user's plant. Thus it is possible for the user to buy the tool tip only, in block form, set it into his own tool holders, and grind to the desired form. Proper procedure and the right kind of grinding equipment may thus help to bring costs down to a reasonable figure.

This session was rounded out by the premier showing of a film on modern die-casting practice, prepared especially for this meeting by The New Jersey Zinc Co.

The film took the audience to the zinc mines, research laboratories and the final steps in the preparation of zinc slabs ready for the automotive die-caster. Then followed shots in some of the outstanding die-casting plants serving the automotive industry.

Two operations were particularly interesting, both showing methods of removing fins from finished die castings. In one, the fins are knocked off in an ingenious fixture. It's very simple, too. The piece is dropped in, hinged sections dropped down as in the act of closing a drill jig, the piece taken out sans fins.

The other operation removes fins by cutting off in a little fixture on a punch press.

Luncheon Brought Members Together

Finishing touches on a fine luncheon which brought together the members of the S. A. E. production activity and the A. S. M. E. machine shop practice division were supplied in a brief talk on the matter of "Adjusting Equipment Policies to Current Conditions," by K. H. Condit.

He stressed particularly the need for setting up some definite equipment policy flexible enough to meet the demands of changing economic conditions. The most constructive element in this direction is the work of the President's Rehabilitation Committee which is headed by A. W. Robertson, chairman of the board, Westinghouse Electric & Mfg. Co.

Among other things, Mr. Condit mentioned the false economies practiced by some plants where under restricted budgets the production department is rebuilding old tools to save the investment in new machinery. In many cases the amount of money spent is considerable and represents a sensible percentage of the cost of a modern tool capable of many years of useful life.

This policy places a staggering burden on the maintenance department and imposes excessive repair bills. Now as never before, the production department must weigh carefully the economics of every move. A shortsighted policy at this time will prove to be costly indeed.

As usual, the A. S. M. E. machine shop practice division staged an excellent technical program. Walter Ernst, development engineer, Hydraulic Press Mfg. Co., read an instructive paper on the application of hydraulic mechanisms for machine tools. "Influence of Oil Compressibility on the Speed Characteristics of Hydraulic Presses" deals chiefly with the mathematics involved in the design of an hydraulic system. Formulas for the time lag caused by the compressibility of the oil are derived. Perhaps there is something in this that may be of great value to engineers concerned with the development of high-speed Diesel injection mechanisms.

The possibilities of cutting costs through the use of die castings are explored by Louis H. Morin, chief engineer, Doehler Die Casting Co., in his paper, "Design of Product to Utilize Die Castings." Chief advantages of die castings and really the reason for adopting the method are to save machining operations, reduce weight, and improve appearance. Obviously the objective is to design so as to eliminate as many machining operations as possible.

Designers are not taking advantage of all the benefits offered by the die-casting process. For example, it lends itself admirably to such work as internal gears, step gears, and the like, which are produced in finished form ready to assemble. Another advantage is the elimination of keys and other types of fastenings by coring square or odd-shaped holes in the work, thus eliminating machining and simplifying assembly operations.

There are, of course, many places where die castings are indicated because of the difficulty of finishing by any ordinary machining methods. One speaker mentioned that the Chronolog is a good example of this, since it was necessary to use die-cast parts throughout in order to eliminate costly machining.

Precision Grinding Discussed

"The Technique of Size Control in Precision Grinding," by R. E. W. Harrison, as the title indicates, is a discussion of the elements of precision grinding and the most economical utilization of precision grinding equipment.

Economy lies in the determination of the best tolerances on the work presented to the grinder from preceding operations. For best results, the work should come through without eccentricity, without excessive variation in dimensions, and with the maximum stock removed. The latter is most important because the precision grinder is essentially a finishing machine and must not be expected to remove much material.

The objective is to get the most work out of the machine within its range and power capacity.

J. V. Emmons, Cleveland Twist Drill Co., furnished a very able discussion on the materials available for modern cutting tools. Interestingly enough it followed, in more detail of course, a recent editorial in *Automotive Industries* concerning the complications presented by the increasing variety of tool materials.

Mr. Emmons thinks that the trend is to more variety of specialized tool materials rather than any simplification. This means that the production tool department must familiarize itself with the available tool materials, their special properties, peculiarities, and best applications. Then they can select intelligently the tool material best suited for any given job.

Curiously enough, the introduction of new cutting tool materials has not tended to eliminate the older types. Rather the tendency has been for each material to find its own peculiar place in the scheme of modern production. For example, carbon steel tools are still with us and continue to be the most versatile material for light work, especially on hand operated machines.

Offset Electrodes Can Be Water-Cooled

By G. N. Sieger
Metallurgical Director, P. R. Mallory & Co.
Indianapolis, Ind.

WELDING of larger formed parts, especially where the product has curves and artistic shapes, has offered many problems to the welding engineer. Not the least of these has been the curving and offsetting of electrode shanks, to enable the operator to reach the welding spots.

For the most part, such electrodes have been shaped of solid, hard-drawn copper, often at a considerable outlay of time and money. The limits of the tip proper have often been small, the heat intense, mushrooming common, redressing frequently necessary and short-lived.

If there is any place where water-cooling, with quickly replaceable tips has been needed, it is in work of this type. Yet because of high costs it has seemed impractical to make water-cooled holders in the shapes needed for much of this work.

Today, after much experimenting, we have found a satisfactory method of building water-cooled holders of almost any design needed to reach work in out-of-the-way spots. Such holders, no matter what their shape, cost little more than standard straight holders such as are used now with the regular Elkaloy tips.

A piece of hard drawn copper tubing of the desired size and side-wall thickness is threaded at both ends, packed with fine sand or low melting point alloys, and plugged. This tube is then bent to the pattern of the holder. If a taper is necessary, even this can be arranged by swaging, while the tube is filled, although care must be taken not to weaken the sidewall section.

The plugs and sand or alloys are removed, and a standard water-cooling attachment, with a flexible discharge tube, is fitted into the upper threaded end. The lower end of the holder is then swaged to a friction fit upon a replaceable electrode of suitable size, or threaded to fit a threaded electrode.

The result is a holder which will last for years, and a water-cooled tip which will last many times as long as the uncooled copper tip, without mushrooming or replacing. And, naturally, cleaner, safer and faster welds result.

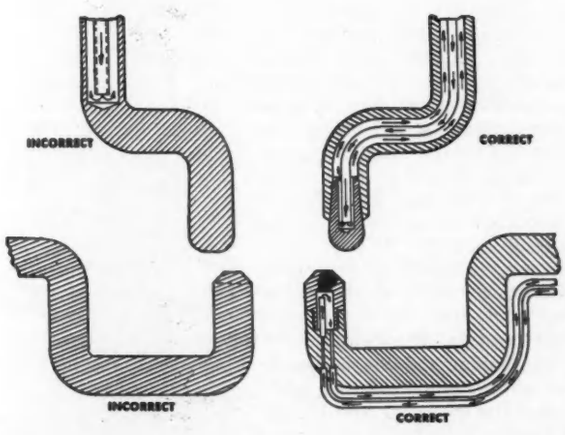


Fig. 1—Correct method to take the place of that at the left. Here is a water-cooled holder with a small, flexible copper tubing inserted for intake and outlet

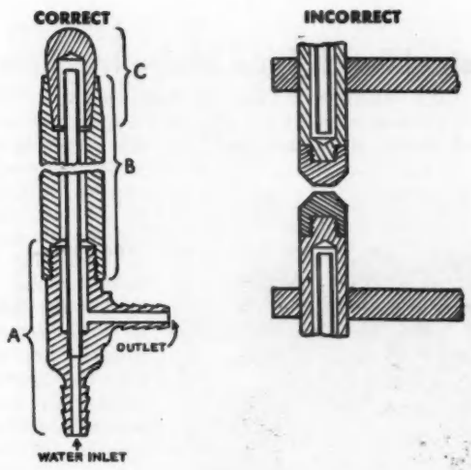


Fig. 2—The diagram in the center shows a Mallory-Elkon Replaceable Tip used with the Mallory-Elkon Water-Cooled Holder, illustrating a method of water-cooling.

Too, the operator gets the feel of his tools, and works faster. His electrode position is not changed with each redressing. In fact, where Elkaloy tips are used redressing is found to be infrequent and the change in the shape of the electrode slight.

In actual practice, many unsafe spot-welds are made. Some of these are due to mushrooming of uncooled electrodes or ordinary copper, whch cannot stand the heat and pressure of good spot welding very long without spreading and doubling or even trebling the area of resistance, with slow heating, scaling, and weak, imperfect welds.

Experience proves that an equally large number of defective welds, and much of the mushrooming are aggravated by the oxidation of holders and shanks. We have inspected many uncooled holders and shanks in service which were causing trouble, and found that the layer of copper oxide, due to high temperatures, was fully 0.001 in. in thickness. Once resistance between the holder and its sleeve is started, added heat at this point results in still deeper oxidation until any welds made on the machine are certain to be unsafe.

This is completely obviated by water-cooling. The water-cooled holder oxidizes slowly, particularly where the sleeve contact protects it.

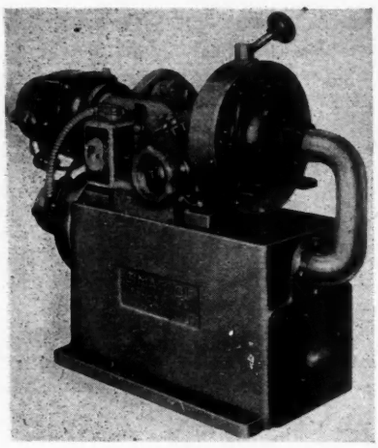
The contrast between the correct and incorrect methods of water cooling is shown in Fig. 1. In a similar fashion, Fig. 2 illustrates the right way of making standard holders for routine jobs.

MACHINE TOOLS and S

In the absence of a Machine Tool and Equipment Show this year, Automotive Industries takes pleasure in offering its own display of new tools + + +

Cimatool Bench Type Boring Machine

The City Machine & Tool Works, Dayton, Ohio, has recently completed work on the development of a line of diamond boring machines made in three types to meet a wide range of applications. Illustrated is a bench type machine adapted for such boring operations as the bronze or babbitt bushings in end frames of small electric motors, for the boring of wrist pin bearings in small refrigerator pistons, for the boring of all types of small bushings, and for many similar operations up to ¾-in. in diameter.



It is a semi-automatic machine in that the operator places a piece of work in position and starts the machine, after which the cycle is automatic, the machine stopping after the bore has been completed.

Colburn Hydraulic Feed Finish-Boring Machine

The Consolidated Machine Tool Corp. of America, Colburn Division, Rochester, N. Y., is offering a finish-boring machine using diamond or tungsten carbide tools.

The machine is designed for rapid production of small parts of cast iron or non-ferrous metals, finish-bored with extreme accuracy. The machine produces round, straight holes, accurately positioned.

Any number of spindles can be furnished, depending on the nature of the job, production required and variety and size of the parts.

The machine illustrated was equipped with five spindles, three in the right hand head and two in the left hand head. It has a complete hydraulic cycle, boring five holes in three different parts, so that unloading, loading and starting the cycle are the only manual operations required.

Two sliding heads are mounted in an opposed position on the base, each of which has independent feed and rapid traverse movements through separate hydraulic equipment mounted in the base and driven by a single motor.

Various types of tables can be furnished, depending on the nature of the job. The machine illustrated was equipped with a two station indexing table on which were mounted two complete sets of holding fixtures. One set of parts is loaded while the other set of parts is being bored, so that production is practically continuous. The only non-productive time is to index the table.

Motors driving the spindle heads are carefully balanced and drive through multiple silent V belts.

Spindle speeds up to 2620 r.p.m. were furnished to give cutting speeds up to 300 ft. per minute. The feed rate is variable from zero to maximum and can be set at a rate most efficient for the tools.

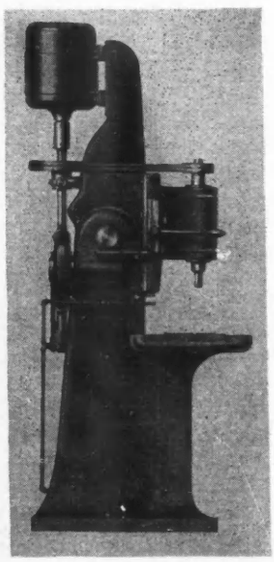
Complete multiple fixtures and tooling equipment, either diamond or tungsten carbide are furnished if required.

Coulter Boring Machine

The Automatic Machine Co. of Bridgeport, Conn., builders of the Coulter Diamond Tool Boring Machines, has added to its line a new type of machine, made in two sizes, each equipped with single or double spindles.

In the double spindle design, the spindles are adjustable, center to center for two holes in one piece, or for boring holes in two pieces simultaneously. While a production machine in every way, it is so constructed as to bring the price within the reach of many concerns. The feed mechanism is by cam, similar in design to those used on automatic screw machines of the B & S type, whereby a roughing or coarse feed on the down stroke and a finer feed on the up stroke produces quality work.

The boring spindle is equipped with removable bar ends to suit the diameter and length of hole to be bored, and is provided with fine adjustment to the boring tool, graduated in tenths of a thousand.



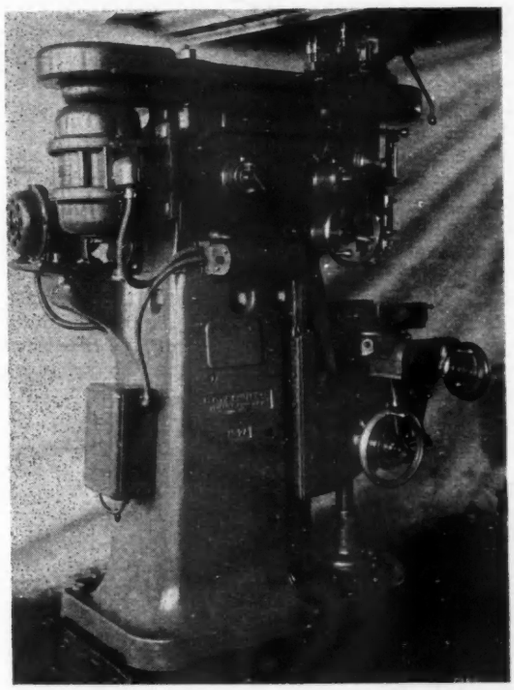
SHOP EQUIPMENT

Announced for 1933

Pratt & Whitney Universal Die Sinker

Pratt & Whitney Co., Hartford, Conn., has placed on the market a new die-sinking machine known as the No. 2A Universal die sinker. It is said to be a distinct departure from previous die sinkers, and contains new features which have greatly speeded up die production. Savings up to 75 per cent have been recorded in regular production with the new machine.

The No. 2A Universal die sinker applies a new idea to die making, that of making cherrying cuts without special attachments or special cutters, and using power to feed the cutter. This has the double effect of shifting a very difficult hand operation to a quick machine operation, and

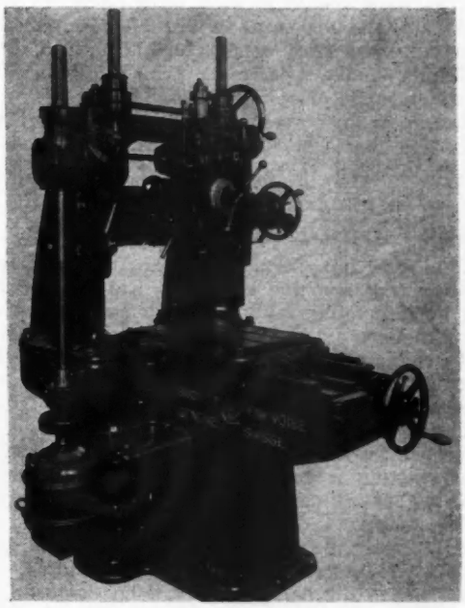


eliminating costly cherrying cutters. Only standard die-sinking tools are used for either straight or cherrying cuts.

One of the principal features is the oscillating head equipped with power feed using a separate motor. By means of this head an ordinary die-sinking cutter is moved through a semi-circular path producing a cylindrical cavity. This method is much faster and a great deal more accurate than the old way. In addition it produces the correct draft on the die, and eliminates cutting the draft by hand afterward.

Swiss High Precision Borer

Through the R. Y. Ferner Co., Investment Building, Washington, D. C., their American distributors, the Societe Genevoise d'Instruments de Physique of Geneva, Switzerland, is placing on the market an improved model of one



of the smaller sizes of the Swiss high-speed precision borers designated as MP-3C. The changes made in this machine lend themselves to greater speed of operation than ever, and have made this machine specially useful for direct production of parts in small lots—up to 100 pieces advantageously—as well as to development work, the building of first models of new machinery, and also the making of repair parts.

Though this machine is of smaller capacity than models MP-4B and MP-5B, its size is such that parts produced on it may be as large as those for which jigs are made on the next larger machine, the MP-4B. The table of the MP-3C is 15 x 20½ in. and the free space between the vertical uprights is 23½ in. The boring head, which is carried by a movable cross rail, can be moved across the table through a 12-in. range. The table can be moved beneath the spindle through 18 in. range.

The cross rail which carries the boring head has a vertical displacement of 15¾ in., to give a minimum space between it and the table of 5¼ in. and a maximum space of 21 in., sufficient to permit drilling and boring jobs as high as 16 or 18 in.

Porter-Cable Carbo-Lathe

The 2nd series Carbo-Lathe recently announced by the Porter-Cable Machine Co., Syracuse, N. Y., incorporates many improvements which provide greater rigidity, greater strength, and a wider variety of tool set-up.

Both front and rear bed ways are identical, allowing unique set-ups. Two carriages can be used at once—one on front and one on rear, for rough and finish turning; or one regular carriage and one taper attachment carriage for turning straight and tapers simultaneously. Other com-

binations are two facing attachments—one for straight facing and one for angular facing; or any one of these attachments in combination with the other.

A heavier tailstock of two-piece construction is used.

Drive is from a motor concealed in the base to single plate dry disk clutch which also carries a brake for quick stopping of the spindle. If desired, the lathe can be driven from a countershaft by removing two small covers from the top of the clutch guard, allowing the belt to pass through the guard directly onto the clutch pulley. The drive continues through pick-off gears at the front of the lathe to a worm and worm gear which drives the spindle. Spindle pick-off gears have been widened to 1¾ in., increasing their strength 40 per cent. The worm gear drive now comes in two ratios, the low gear with a ratio of 3½ to 1 and the high gear with a 2 to 1 ratio.

The spindle speeds obtained with 1800 r.p.m. motor and low geared head are 95 to 1130, with feeds of .005, .010, .015, .020, .025 and .030 in.; and with high geared head 170 to 2000 r.p.m. with feeds of .003, .006, .010, .013, .016, .020 and .025 in. Variable speed motors can also be used to get even a wider range of spindle speeds.

The lathe will turn work up to 7 in. in diameter x 18 in. long, and for short chucking work will handle pieces up to 12 in. in diameter.

Madison-Kipp Die-Casting Machine

The Madison-Kipp Corp., Madison, Wis., announces a small die-casting machine known as Kipp-Caster No. 11. Some of its interesting features are: small size; ability to handle all common die-casting alloys including magnesium; quick die-changing arrangement; convertibility into a permanent mold machine for casting brass; operation which requires no previous training or skill in the art of die casting.

The mechanism is built into a one-piece body made of a semi-steel casting a yard long, which is attached to a one-piece leg casting bench high. The essential parts are: base, body, ram, main pinion operated by spoked wheel, metal well, metal forcing plunger, plunger operating lever and die-locking plunger.

The stationary die half is mounted on the head platen by means of one locating pin and one wing nut which takes its final lock by a blow from a hammer and is similarly unlocked. The movable die half is mounted on the ram die head by means of one locating pin and two bayonet cam tracks which fit over two pins of the ram ring. The handle of the ram ring is struck with a lead hammer for its final lock and also for the reverse order of unmounting.

Lucas "Precision" Machine Drive

Additional speeds 447 to 1200 r.p.m. to the 3 in. diameter main spindle of the No. 41 Lucas "Precision" Horizontal Boring, Drilling and Milling machine with antifriction bearing spindle construction are now obtainable from the Lucas Machine Tool Co., Cleveland, by means of the Hi-Speed Drive employing multiple V belts for the final drive, thereby avoiding excessive peripheral speeds of toothed gearing, otherwise unavoidable and prohibitive. This drive supplements the regular spindle drive by means of large spur gears for the ordinary range from 13⅓ to 381 r.p.m. Similarly, speeds up to 1000 r.p.m. for the 4 in. spindle and 860 r.p.m. for the 5 in. spindle of the larger size machines are available.

Somer & Adams Polishing and Buffing Machines

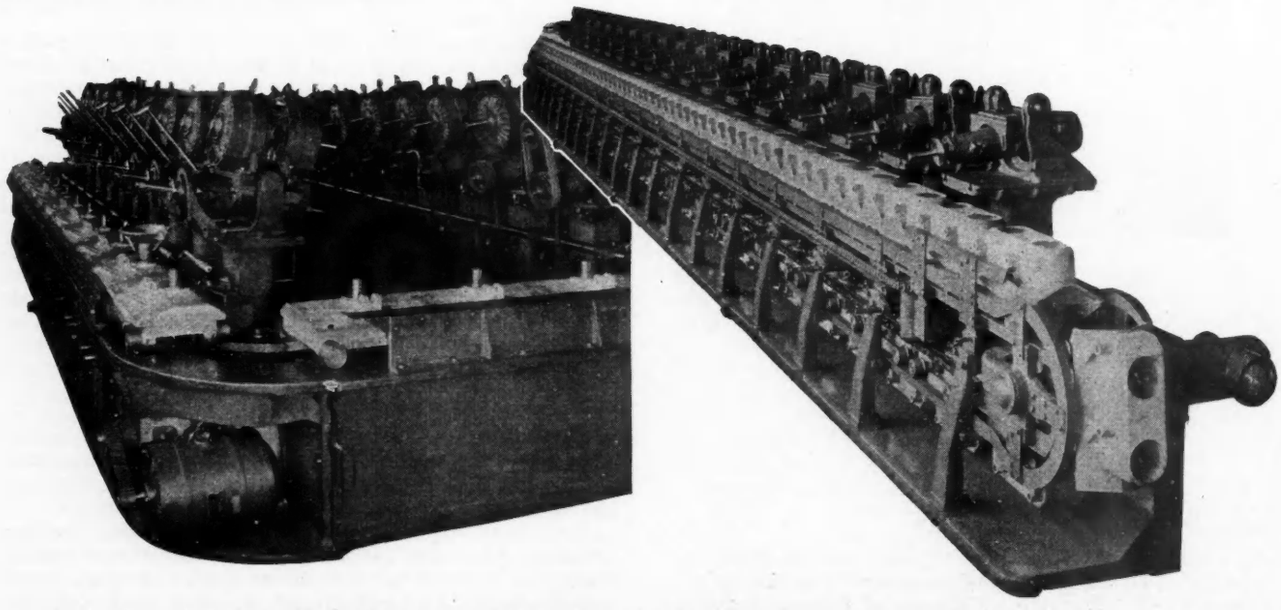
Continuous automatic polishing and buffing operations on a wide variety of automotive parts are achieved through applications of the line of continuous-feed polishing machines built by The Somer & Adams Co., Cleveland, Ohio.

Fig. 1 illustrates a unique application of a caterpillar type of feed. Head light reflectors are being polished at the rate of 1000 per hour. A large wheel is required for the open end and a smaller wheel for inside end of each reflector. Reflectors are polished in groups of five. The first five wheel heads in each row carry large diameter wheels while the second five wheel heads in each row carry small diameter wheels. The operator loads five reflectors at one end of the row. The chucks then index along five stations and the big wheels automatically swivel down to the work which revolves under the wheels for a suitable number of revolutions. The wheels then swivel out of the work and it indexes along another five stations and the operations repeated.

Work is unloaded at the far end of the row and five more reflectors loaded for polishing are indexed along the row of ten wheel heads shown in the background. By this arrangement the number of chucks is kept down and floor space reduced but production is equal to that of two separate machines.

Fig. 2 shows the feed mechanisms with carriages and spindles for an 18-wheel-head machine for polishing and buffing stainless steel hub caps at the rate of 1000 per hour.

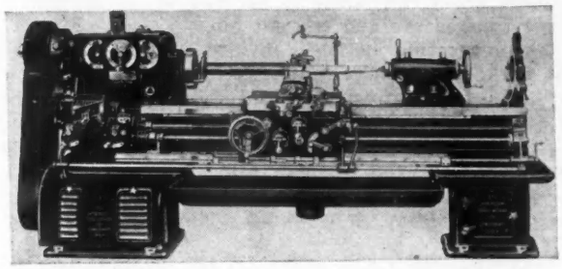
Continuous-feed machines employing the same general principle are built by the company for grinding, drilling, tapping, milling, automatic welding and broaching, etc.



Left: (Fig. 1) S & A Caterpillar feed. Right: (Fig. 2) Feed mechanism with carriage and spindles

American Multi-Production Lathe

Designed specifically for the utilization of cemented carbide tooling, the Multi-Production lathe recently placed on the market by The American Tool Works Co., Cin-



cinnati, Ohio, offers some interesting possibilities in automotive production. Recent demonstrations in cutting steel, cast iron, and brass are said to have developed outstanding performance records.

Sundstrand Junior Stub Lathe

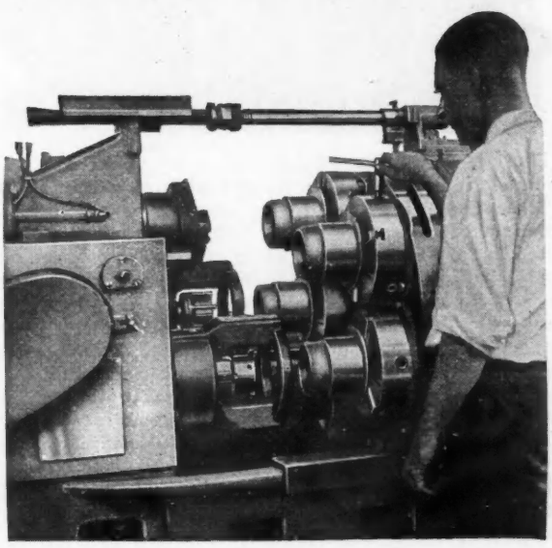
Strength, power and rigidity have been built into the Sundstrand Junior Stub Lathe to accommodate the widest use of cemented tungsten-carbide tooling. According to the Sundstrand Machine Tool Co., Rockford, Ill., makers of this machine, it has been designed both for small lots and quantity production. Capacity between centers is 18 in., swing-over tool slides, 8 in. diameter.

The machine has automatic control of spindle and feeds with spindle speeds varying from 128 to 3600 r.p.m., depending upon the size of the driving motor. Front carriage feeds 0.0015 to 0.042 in. standard. Front and rear bearings are anti-friction.

Motor drive is optional as follows: 5 hp., 1200 r.p.m., spindle speeds, 128 to 1346 r.p.m.; 5 hp. or 7½ hp., 1800 r.p.m., spindle speeds, 195 to 2050 r.p.m.; 7½ hp., 3600 r.p.m., constant speed. The coolant pump is mounted at the side and driven by vee belt. Floor space required is 46 by 78 in. Net weight, 2050 lb.

Goss & DeLeeuw Duplex Chucking Machine

To meet the requirements of modern production, the Goss and DeLeeuw Machine Co., New Britain, Conn., has developed a full line of multiple spindle chucking machines known as the "Duplex" type, wherein all the tools and all the chucks can revolve simultaneously. Various other combinations can be had in the same machine, such as all the tools revolving while chucks remain stationary; chucks revolving while the tools remain stationary; or chucks revolving and any number of the tools revolving, the others remaining stationary. Two standard cross slides are provided.



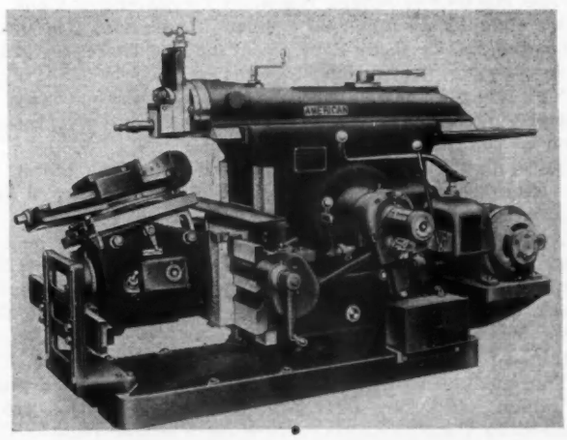
The Duplex machines are a supplementary line to the established line of four-spindle tool revolving machines known as the 6 x 6¾ in., 8½ x 8 in., and 11 x 10 in., and are basically the same in design, with the exception of a different face plate carrying the revolving chucks, and the addition of the two cross slides. The same rigid and fool-proof construction is retained throughout. The tool spindles and their drive remain the same as does also the heavy turret with its integral cam feed.

The chuck spindles are mounted on large anti-friction bearings (either ball or taper roller), in the deep face plate, and get their drive from a separate motor. Each chuck, as it indexes into the loading position, is automatically thrown out of engagement with its drive, and stops to enable the operator to unload the finished piece and load a rough one. It automatically starts to revolve again as it indexes out of the loading position.

The smallest of these Duplex machines, the 6 x 6¾ in., has a maximum feed stroke of 6¾ in., and will swing a piece 6 in. in diameter; the largest, the 11 x 10 in., has a maximum feed stroke of 10 in., and will swing a piece 11 in. in diameter. If the machines are used as purely tool revolving machines, larger pieces can be handled.

American Shaper With New Table

To extend the uses of its recently announced line of auto-oiled shapers, The American Tool Works Co., Cincinnati, Ohio, has added a variety of special tables and



vises, also an automatic compensating table support. This is expected to provide tool and die shops with shaper equipment of unusual flexibility.

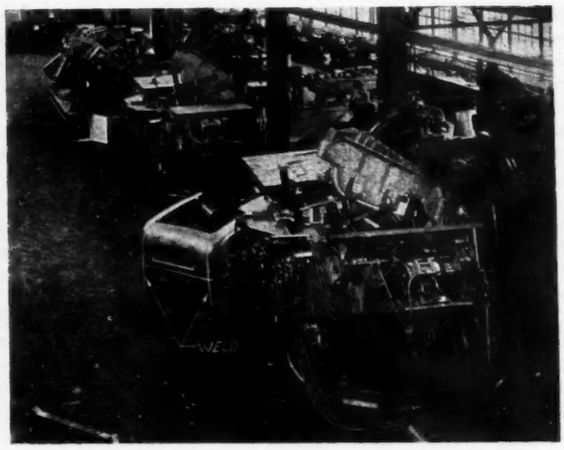
Federal Huge Flash Welders

Four flash welders each weighing 20 tons, and capable of handling any type of automobile body welding requirement, were recently built for a large European car maker by The Federal Machine and Welder Co., Warren, Ohio. The machines embody many unusual features of design which are said to be covered by U. S. Patent 1,857,060.

The welders have been designed to anticipate the demands of streamlined body construction. While built primarily for welding back panels to side panels of sedans and tonneaus, they will accommodate any type of construction in any width up to 60 in.; any depth or contour up to 25 in. wide.

Power is supplied by two G.E. motors, 3 hp., 50 cycle, 220-440 volt, 1000 r.p.m. The transformer is rated at 300 kva. Federal flash-proof type, hung under the machine. Pressure is applied by two Curtis air cylinders which act on an equalizing shaft, a patented feature, insuring equal distribution of clamping pressure.

The hydraulic mechanism for raising and lowering the



four clamp arms consists of a 5 hp. G.E. motor and a geared pump connected to a 5-gal. tank as an integral power unit.

The flashing period of approximately 8 sec. is accurately controlled by a motor driven cam.

Gleason Gear Generator

To further speed up gear production and cut costs, the Gleason Works, Rochester, N. Y., has placed on the market the No. 9 Completing Generator which completes the roughing and finishing operations on differential gears and pinions in one chucking.

The machine is loaded manually by placing a blank on the spindle in the uppermost or loading station. The blank is automatically secured in place and the turret advances it to the roughing station.

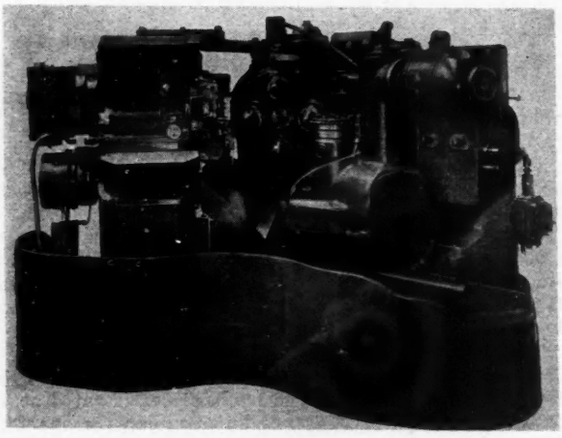
The blank is next roughed and when this operation is completed, the turret advances to an intermediate station, then to the finishing station.

After finish cutting, the turret advances the pinion to the loading station where it is automatically released and manually removed.

After the machine has completed its first cycle, the operation is continuous and as each spindle arrives at the loading station, a finished gear or pinion is removed and a blank is loaded, while the cutting is in progress at the other two stations. Thus, one finished gear or pinion is obtained for every 90 deg. of index of the turret drum.

The machine is arranged to prevent the completed gear or pinion which has arrived at the loading station from proceeding through the cutting cycle a second time.

The roughing cutter is fed into the blank traveling at right angles to the root line. This is controlled by a



hardened positive cam. The cutter is withdrawn and the blank indexed to the next tooth until the blank is completely roughed.

The cutter spindle is mounted vertically on anti-friction bearings with a large balance wheel to obtain smoothness of cut. It is driven by a pair of spiral bevel gears. The cutting speed can be varied from 104 to 202 ft. per minute through change gears. The whole unit is mounted in a large cross rail which is secured to an upright by a large tapered gib and one flat gib.

The generating motion is divided between the tools and the work. The relative roll between the tools and the work is obtained by a crown gear and segment, the latter being of suitable pitch angle for the gear or pinion being cut.

A large double gibbed cradle is oscillated in its housing by a cam to provide the generating roll.

The machine requires four motors as follows:

1—2 h.p., 1800 r.p.m. motor for the roughing cutter drive.

1—2 h.p., 1800 r.p.m. motor for the finishing tool drive.

1—1 h.p., 1200 r.p.m. motor for the turret index drive.

1—5 h.p., 1200 r.p.m. motor for the main drive and cutting oil pump.

Electrical control is so arranged that the cutting unit motors must be started before the feed motor operates.

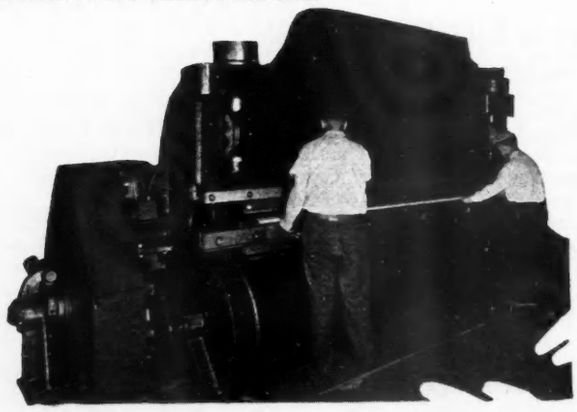
Floor space required is 65 x 96 in. Net weight, 17,000 approx.

Farrel-Birmingham Press-Brake

The new Rafter Press-Brake built by Farrel-Birmingham Co., Inc., of Ansonia, Conn., combines, with other distinctive features, welded construction of its unusually deep ram and bed.

The bed is made of rolled steel plate, welded into a heavy, rugged girder section, designed to bring deflection under capacity load to a minimum, without weaving and side distortion. The gear casings and housings for eccentric and gear shaft bearings are welded integrally with the bed. All welded steel parts are carefully annealed and normalized after welding and before machining to remove any stresses occasioned by rolling or welding.

The ram is a solid rolled steel plate of sufficient thickness and depth to secure minimum deflection under capacity load. Adjusting screw housings, guide bosses, etc., are formed by welding and the ram is annealed and normalized the same as the bed.



There is no driving mechanism on the upper part of the machine; it is all attached to or contained within the bed.

The unique feature of the machine is the exclusive principle of operation which pulls the ram from below instead of pushing it from above, resulting in mechanical and operating advantages. Power is transmitted from the driving motor to the flywheel on the drive shaft through multiple "V" belt and friction clutch. Generated, cut tooth gears enclosed in oil-tight casings connect the drive and intermediate shafts with individual eccentrics at each end. These in turn, actuate the long, C-shaped connecting rods which pull the ram into the work.

The base and the ram are the only two major members of the Rafter Press-Brake.

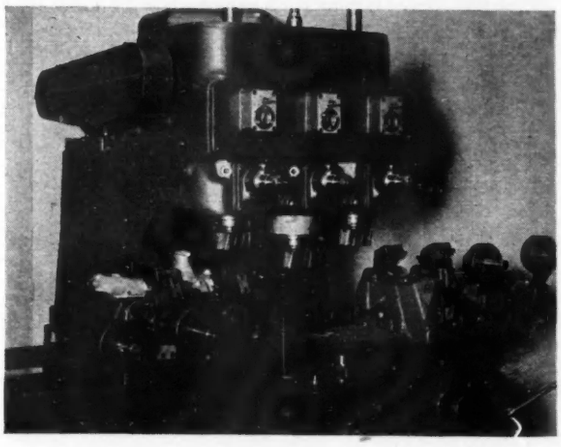
The Rafter Press-Brakes are built in a variety of sizes and those most commonly used are carried in stock for prompt shipment.

Cincinnati Hydromatic Miller

A milling machine of interest has recently been developed by the Cincinnati Milling Machine and Cincinnati Grinders, Inc., Cincinnati.

A special head with three vertical spindles is mounted on a dummy headstock attached to the bed of a 3/36 Plain Cincinnati Hydromatic miller, with a two-way feed cycle. The spindle details are the standard No. 3 size with 8-in. dia. quill and 4-in. end adjustment with center-to-center distance fixed at 10 in. The motor for driving the vertical spindles is mounted directly on top of the head, while the motor for driving the standard Hydraulic unit is mounted in the dummy headstock.

Two special fixtures, each holding one piece of work, are mounted at opposite ends of the machine table. The work



rests on the previously finished bottom and is located by means of dowel pins from two holes. Four clamps operated by two weighted levers hold each piece rigidly in position.

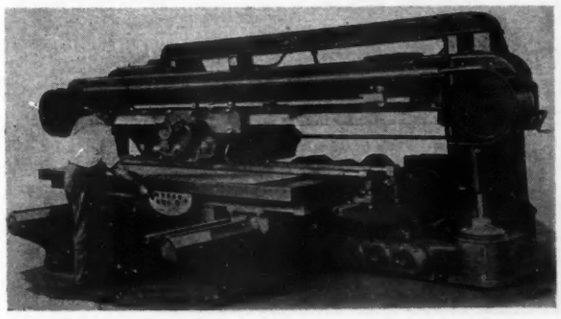
The reciprocating method of milling is used, the operator removing and replacing the work in the fixture at one end of the table while the work in the other fixture is being milled. After milling the work in one fixture, the direction of the table travel is automatically reversed and the table rapid traversed at 300 in. per minute to bring the work in the other fixture to cutting position. In the interest of safety the table is automatically stopped when midway. If the operator has completed the loading he cuts the stop out of the cycle by resting his hand on the stop lever and the work is moved on into the cut. Flipper stop dogs are provided to permit this arrangement.

The center cutter mills the lower pad on the work in each fixture.

Mattison Steel Sheet Surfacer

An improved type of automatic sheet surfacing and polishing machine has been placed on the market by the Mattison Machine Works, Rockford, Ill. It is especially recommended for stainless steel sheets.

Factory-made, flexible, abrasive belts are used instead of set-up belts or rolls. The belts being over 40 ft. long



allow time for the individual grains to cool off between cuts. The flexing of the belt around the contact roll and uniformity of abrasive surface, with the provisions for working with heavier cutting pressure, is said to assure maximum cutting efficiency.

The sheet is held firmly on the table by two spring-loaded, cushioned, hold-down rolls located one near each side of the belt. The cut is made between these hold-down rolls, so the sheet is always held flat at the working point. An indicator, marked in one-thousandths, permits of close power setting for different thicknesses of sheets. The cut is regulated by a fine adjusting screw located in the carriage head. Dust removal is provided for through cast-in chute in the carriage frame and flexible conduit at rear leading to suction fan.

By removing the belt and contact roll, Tampico brushes, buffing wheels, or other forms of polishing wheels can be used. It is therefore a combination rough-grinding and polishing machine in one.

Toledo Huge Presses

Two recent additions round out the line of heavy-duty presses built by The Toledo Machine & Tool Co., Toledo, Ohio. Illustrated is the four-points suspension press weighing about 300,000 lb. An important feature is the use of four supplementary rods in addition to the main tie rods.

The crankshafts are geared together and synchronized to operate simultaneously, each of the four cranks exerting a direct and evenly distributed pressure at one of the four corners of the slide through the four connections. Connections of an improved design and are adjusted at the same time by a motor mounted directly in the slide.

Clamping of adjustment screws is effected from the front and back of the press. Back slideways have removable wearing strips. These features maintain the slide parallel at all times, even on work which may be done at the front or back edges of the sheet. Thus it will be seen that this type of press is specially adapted for blanking, forming, and stamping pieces of large area, particularly with reference to the front to back dimensions of the pieces to be operated upon.

On the heavy duty press the frame is a single steel casting of heavy cross section, reinforced by four large steel tie rods shrunk in place. The legs, or supporting blocks, which are used only when no pit is wanted, are of substanial construction. The heat-treated steel full-eccentric type crankshaft is of large diameter.

The slide is a long steel casting guided in the front by bronze faced gibs. Bolted against the fame, these gibs tie the uprights of the press together, thus adding to the

rigidity of the machine. The front gibs are continuous from the top to the bottom of the slide. Four taper bronze gibs are set in the frame of the press in back of the slide; these permit of adjustment for possible wear, assuring proper alignment of the slide. The press is arranged for receiving a lower cam-actuated knock-out and an upper knock-out.

Single gearing is used so that the press may be operated at a high rate of speed. Steel herringbone gears with cut teeth are employed.

The press is controlled by the "Toledo" improved multiple disk friction clutch with independent brake on the back-shaft, and the operating mechanism is air-controlled by the foot treadle. This mechanism is so arranged that the press may be operated continuously and stopped at will, or by making a slight adjustment, the press will make one cycle for each depression of the foot treadle and stop at the top center. A 30-hp. motor mounted on top of the frame transmits power to the flywheel by means of V-belts.

Landis Type C Semi-Automatic Grinders

The new 6 in. and 10 in. Type C machines plain hydraulic grinders made by the Landis Tool Co., Waynesboro, Pa., are now being offered with special tooling for semi-automatic operation. Although the characteristics of the part to be ground determine, to some extent, the nature of the special tooling, an indexing loading turret arrangement with foot pedal control is frequently an ideal combination. Several such machines recently shipped were arranged to grind the underside of a camshaft flange.

So many of the movements are automatic that all the operator does is keep the turret loaded and depress the foot pedal at the front of the machine. Assuming that a flange has just been ground, the foot pedal is depressed (it latches in this position) with the following operations taking place. First the wheel moves back rapidly to its starting position. Then the work holding collet releases and withdraws into the head, the footstock center withdraws and finally the turret indexes bringing the next camshaft into grinding position.

As soon as this takes place the foot pedal automatically unlatches, causing the locating arm to move forward and the footstock center to advance. The work holding collet advances and grips the work, the locating arm recedes and the wheel moves forward. Grinding starts and continues until the work is to size at which time the wheel base comes against a positive stop. Depressing the foot pedal starts the entire cycle over again. As the turret indexes the finished shafts are carried around to the front of the table where they are transferred to the conveying system by the operator.

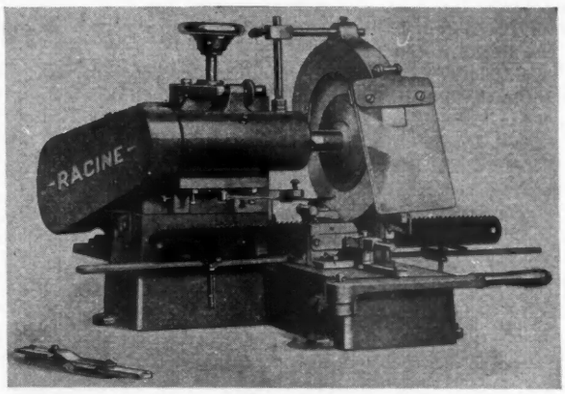
Because this flange is ground from the rough and a very good finish is required both a roughing and a finishing operation are employed. The only difference between the two operations is the locating method.

The 10 in. type C machine was introduced recently as a companion model to the 6 in. It is available in three sizes, 10 x 18, 10 x 36 and 10 x 48. A 10 hp. wheel spindle drive motor is supplied. The net weights of the 10 in. machine in the three sizes are 6700, 7200 and 7700 lb. respectively, without electric motors.

Racine Blade Grinder

To achieve the maximum utilization of expensive high speed hacksaw blades, the Racine Tool & Machine Co., Racine, Wis., has developed a new blade grinder, which is said to be simple to operate and adjust. It has a capacity of blades 1 to 2 in. wide, any length.

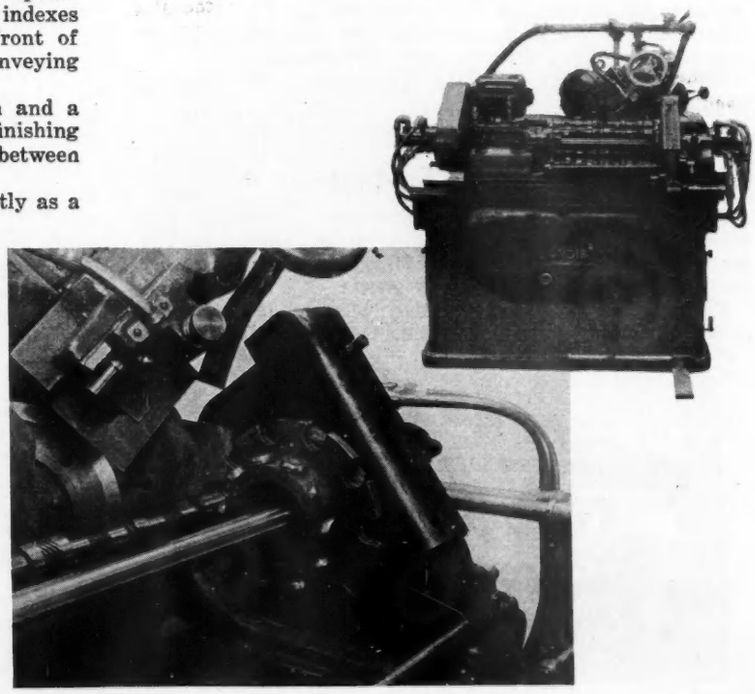
With the machine, perfect vertical and horizontal alignment of the grinding wheel is said to be provided through adjusting screws and the wheel is also locked in position by special studs. The blade is held in such position that teeth are slightly undercut. This is said to improve the cutting qualities over new blades.



The wheel remains in a fixed position while the blade is fed across the wheel. This principle is said to be in keeping with accepted standards of grinding practice. This combined with proper wheel speed and correct abrasive does away with burning of metal in the blade, and leaves a clean, sharp grind, good for many cuts.

The indexing gage used to advance the blade has double fingers. This provides positive advance of the blade on every stroke of the operating handle, even when three teeth in the blade are missing at any one point. Indexing gages are available for blades with 4, 6 or 10-teeth per inch.

The machine is 22 x 22 in. and weighs 90 lb. with motor. The driving motor is ¼ hp., 1725 r.p.m. Spindle speed is 2900 r.p.m.



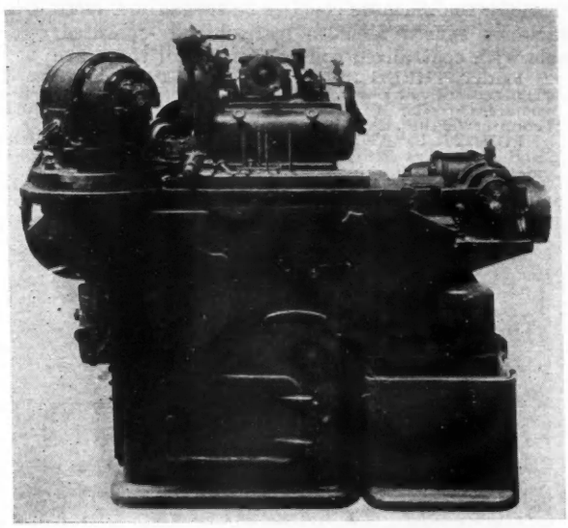
At the right is shown the Landis Type C semi-automatic grinder and the indexing fixture

Landis Semi-Automatic Valve Face Grinder

To satisfy the demand for a comparatively simple high production valve face grinder this special machine has been developed by the Landis Tool Co., Waynesboro, Pa.

A 6 x 18 in. mechanical traverse plain bed is used. A conventional plain feed up hand wheel is provided in order that wheel wear may be compensated for. The size of the grinding wheel is 16 x ¾ x 5 in.

A special individual motor driven live spindle work head sets at an angle on the left-hand end of the swivel table. This angle is such, on a standard machine, that a 45-deg. valve face may be ground. However, the machine may be arranged for any face angle between a minimum of 30 deg. and a maximum of 60 deg. A ½-hp. constant-speed motor is used, the drive being through silent chain and sprockets. The work holding chuck jaws are air operated. Air pressure of approximately 60 lb. is required, this being controlled by a regulating valve.



All the operator does is load and unload the work. The reciprocation of the wheel carriage causes all of the other movements to take place automatically. The length of the stroke is adjustable, there being a ⅝ in. stroke for the operation. A lever at the front of the mechanism is shifted to alter the stroke. A 7½ hp. constant speed main drive motor is used.

The net weight of the machine is 4300 lb.; floor space required is 92 x 48 in.

Cincinnati Squaring and Slitting Shear

A new line of all-steel squaring shears with hydraulic holddowns is announced by the Cincinnati Shaper Co., Cincinnati, Ohio. Unusually high speeds are claimed; for example, the 3/16 in., 10-ft. and 12-ft. shears operate at 60 strokes per minute. The ½-in., 10-ft. and 12-ft. shears operate at 40 strokes per minute.

In combination with the speed an exceptional degree of accuracy is offered. Accuracy is said to be due to several factors, the most important of which are the hydraulic holddowns, the low rack, and the rigidity of the all-steel construction. The hydraulic holddowns deliver great clamping pressures to prevent sheet slippage. They also deliver a uniform pressure regardless of variations in the thickness of the sheets. The low rack or shear angle (5/16 in. per foot on the ⅜ in., 12-ft. shear) greatly reduces distortion in the work.

Globe Tapping Machine

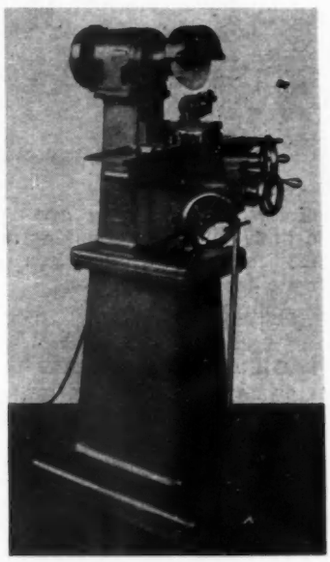
An automatic drilling or tapping machine of universal application has been developed by the Globe Tapping Machine Co., Bridgeport, Conn.

The machine shown in the illustration is equipped with two heavy-duty spindles carrying ⅝ in. x 1¼ in. spotfacing cutters for facing off the protruding inner shaft bushing of a commutator at a rate of 20 finished pieces per minute. One operator is able to load the chutes on several machines as the parts are automatically fed into the dial from the chute. The ejection of the finished parts is automatic.

By using two ball bearing spindles, one for roughing and one for finishing, the parts are finished free from all chatter marks. If the dial should fail to index properly, due to any abnormal resistance, the automatic mechanical trip, which is standard on all machines, will prevent the head from coming down.

National Acme Chaser Grinder

The National Acme Co., Cleveland, Ohio, now offers a chaser grinding machine for precision grinding. It is small, compact and rigid. While primarily intended for grinding tap and die chasers, it can be used to advantage on a wide range of work. In large shops it may be installed close to the threading machines so that chasers need not be carried to the tool room at some distant point. When installed in the tool room it fills a widespread need for a small convenient machine available for a wide diversity of work.



The knee can be readily raised or lowered, or the table moved away from the column, so that a wide range of sizes may be quickly handled.

As an additional convenience, this machine can be furnished with cast iron base mounted on casters for portable use, at slight additional cost. When in use, steady blocks are lowered into place, the front caster being lifted off the floor.

The motor is a fully enclosed ball bearing ½ hp. motor which can be connected to the nearest lighting circuit, a starting switch being provided. Motor spindle is double-ended, arranged for a guarded grinding wheel on one end, the rear end being arranged for a guarded wire brush for the easy removal of feather edges or burrs.

Bench type grinder with fixtures weighs 246 lb. net; with pedestal, 154 lb. net.

National Multiple Spindle Driller

The National Automatic Tool Co. has recently offered to the metal working industries a station type hydraulic feed multiple spindle driller.

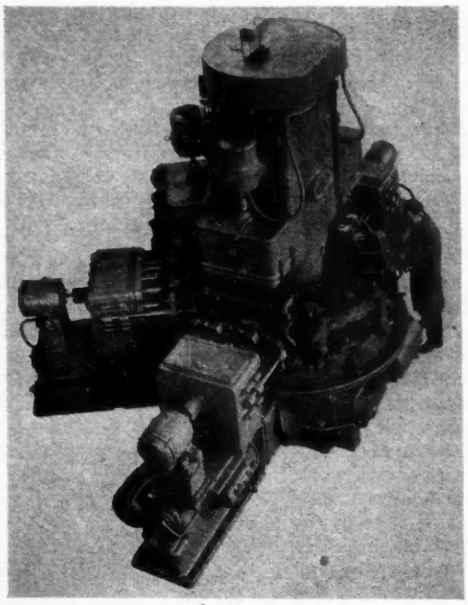
This machine is to be known to the trade as the NATCO station type hydraulic driller. It may be arranged with either 3, 6, or 8 stations, and horizontal as well as vertical hydraulic feed drilling units. The particular machine shown is arranged with six (4 working and 2 loading and unloading) stations. It is arranged with four vertical and four horizontal drilling heads.

The indexing of the table from station to station is accomplished by an automatic mechanical indexing mechanism and the entire machine is so interlocked that the indexing mechanism will not function unless all heads, both vertical and horizontal, are in their correct positions.

It is semi-automatic in operation, and the operator has complete control of the machine through the use of one push button station.

All heads are of the new NATCO quick-change type, and all spindles are roller bearing mounted and arranged with nose adjustment.

This machine is being used by a prominent manufacturer

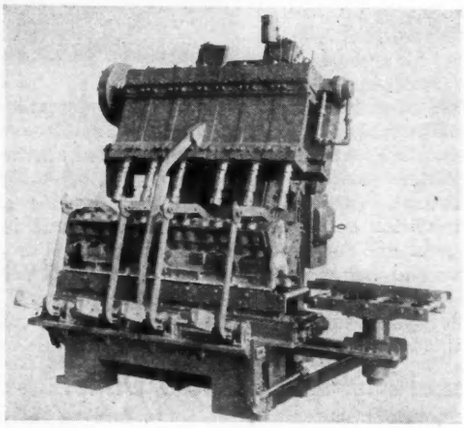


of low priced cars for performing a total of 132 different drilling and countersinking operations in the bottom and manifold side of a cast iron cylinder block at an approximate rate of 75 per hour.

Approximate weight of this machine is 62,000 pounds.

Moline Hole Hog

The Hole Hog No. 13 Special Cylinder Borer, made by the Moline Tool Co., Moline, Ill., is a single, inclined column, hydraulic feed machine rigidly built for rough and finish boring V-type cylinder blocks.



The spindles are driven by the Moline Tool Company's standard spiral worm and gear drive with a circulating oil system so that the drive gears run in an oil bath.

Spindle heads have a large diameter, preloaded, Alloy steel spindle, mounted in Timken taper roller bearings. With this construction, along with the V-type ways, ample length of rail slide, and strength of column, cylinder blocks are said to be bored within commercial tolerances without top or bottom guide bushings, eliminating an expensive fixture and cost of maintaining pilot bushing alignment.

End cutting multiple blade cutters are used.

The machine is started by the shifting of a conveniently located lever in front, which engages the feed, giving rapid approach of the spindles to the work, proper feed, dwell if necessary, and quick return of the spindles to starting position and traverse stopped. As the spindles approach the work, the cylinder blocks are automatically clamped, and after the cutting tools leave the work the clamps are automatically released.

The fixture is designed to hold two V-type cylinder blocks, allowing both the right- and left-hand banks in the block to be bored on the one machine.

A 30 hp., 1200 r.p.m. motor is used on both the rougher and semi-finishing machines.

The approximate weight of this machine, including fixture and turntable is 27,200 lb. The floor space, including fixture and turntable, is 10 ft. 6 in. x 9 ft.

Barnes Continuous Type Driller

Seventy-seven machining operations consisting of boring, reaming, counterboring and tapping one side of a gasoline pump body are achieved on this continuous production drilling machine recently built by the Barnes Drill Co., Rockford, Ill. Unit type construction is easily the most outstanding feature since it is possible to machine other parts of the line simply by changing heads and fixtures.

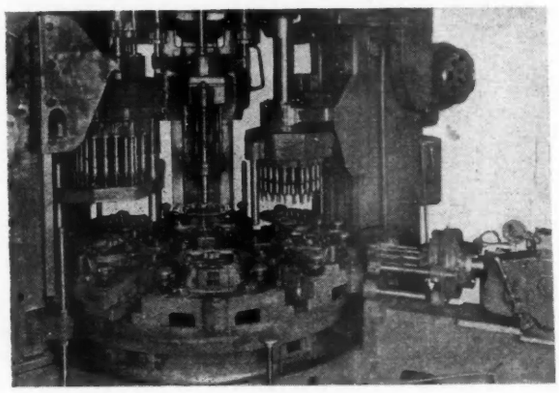
Production is at the rate of over 90 pieces per hour or about 6930 separate operations in one hour.

Briefly the machine consists of standard Barnes drilling machines spaced about a hydraulically-operated circular table with centralized control. In detail there are:

FIRST THREE SPINDLES—No. 252½ Single Speed Hydraulic Feed Units, with individual motor drives, independent feeds, dwell for facing, flanged sleeves, and counterweights.

FOURTH SPINDLE—No. 242 with eight geared speeds and positive geared thread leading feed, cam feed attachment, automatic reverse and hydraulic clutch control, flanged sleeve and counterweight, silent chain motor drive.

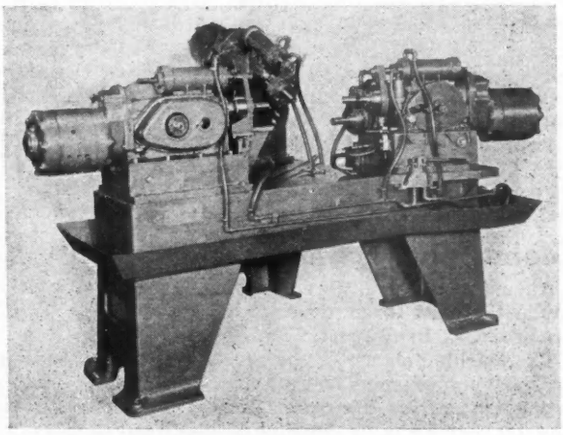
FIFTH SPINDLE—Horizontal unit with cam feed and electric control.



Millholland 4-Way Driller

Millholland Corp., Indianapolis, announces a four-way drilling machine for drilling angular holes in small forgings, to obtain extreme accuracy of location, and to eliminate straightening operation after drilling.

The forging is coined to set hole bosses in their correct position. Thus when placed in the fixture the bosses fit against pads which prevent springing when holes are drilled. A single air valve starts the feeds on all the drilling units simultaneously so that they go through their cycle with practically instantaneous return and stop.

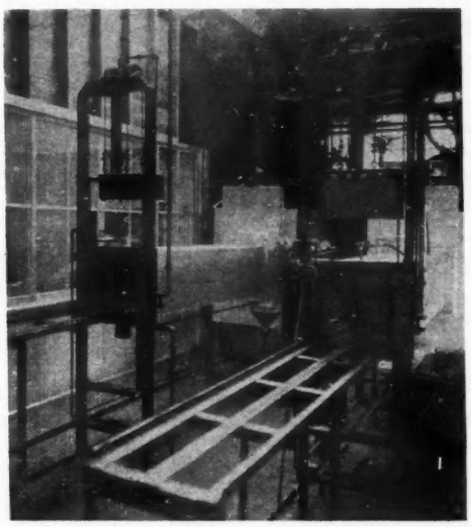


Four standard Millholland automatic drilling units are employed, the mounting bases being made to the correct height and proper angle. Due to standard unit construction, a special setup of this character can be delivered to the customer in approximately the same time it takes to construct a fixture. Mounting bases are provided with fine pitch adjusting screws for tool setting. The nut can be quickly disengaged and the entire unit withdrawn in the slide by means of rack and pinion.

Electric Furnace for Continuous Heat Treating

The Electric Furnace Company, of Salem, Ohio, has developed an inexpensive gas and several types of controlled atmosphere furnaces for bright and clean annealing and for preventing decarburization or oxidation in heat treating.

On products requiring hardening, such as gears, sprockets, bolts and miscellaneous other small and medium-size products, the material is conveyed through these con-

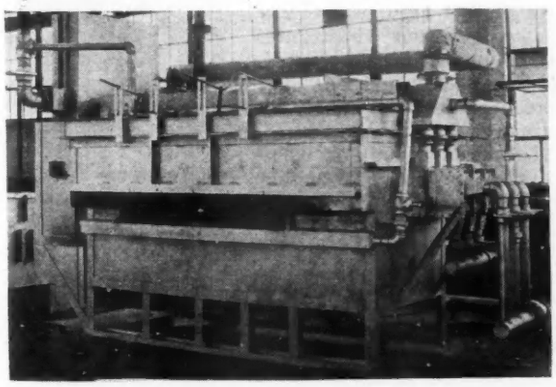


tinuous furnaces in a protective gaseous atmosphere and quenched directly from the furnace.

In annealing operations, the material comes from the furnaces uniformly annealed, sufficiently clean to eliminate pickling with its problems and costs. This equipment is built for ferrous or non-ferrous metals in sizes to handle any production required and for material in various shapes and forms.

Surface Combustion Gas-Fired Forge Furnace

An improvement in gas-fired forge furnace practice is claimed by the Surface Combustion Co., Toledo, Ohio, by the application of diffusion combustion which they have recently developed.



In diffusion combustion, gas and air are maintained in separate layers, and combustion proceeds only at the flame boundaries. No actual mixing of the gas and air takes place except at these boundaries. By segregating the lowermost layer of gas, causing it to sweep over the work laying on the hearth, it is possible to completely blanket the work from the effects of the superimposed layers of air and products of combustion. Correct ratios of carbon-monoxide to carbon-dioxide can be maintained and conditions produced wherein the elevated temperatures of forging the steel itself can be treated without oxidation.

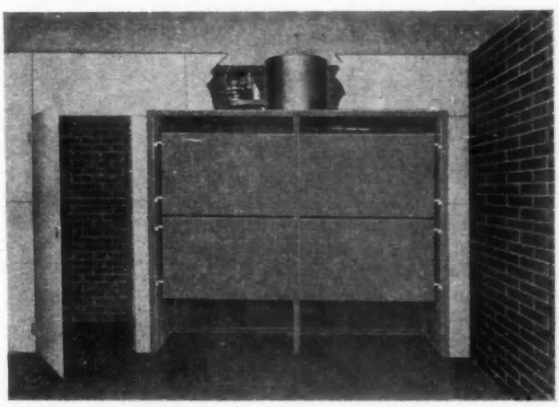
Utilizing this process the steel comes from the furnace free from oxide. Nevertheless, the steel oxidizes very rapidly when exposed to the air in the process of shaping. The scale so formed, however, is very light and peels off readily. The total amount of scale formed has been considerably reduced and due to its thinness, the abrasive effect on the die is greatly reduced.

In addition to making possible the protection of the steel, diffusion possesses other valuable characteristics. By this method, the hydrocarbons of the fuel gas are quickly heated to high temperature in the absence of the necessary air for combustion.

DeVilbiss Co. Exhaust Chamber

The DeVilbiss Co., Toledo, Ohio, manufacturers of spray-painting and finishing equipment, announces a new type of exhaust chamber, recommended for use where spraying is done in an already fireproof room. It is designed to provide a means of mounting the exhaust fan and to distribute the exhaust properly where a complete spray booth is not required or where an exhaust fan mounted in the wall or window will not adequately take care of the requirements. In effect it is actually the back section of standard spray booths.

The chamber is placed in the rear of the room and the exhaust pipe is run out through a window or the roof. The space around the chamber may be filled in flush in the front with sheet metal, tile or other noninflammable material, with a door providing access to the exhaust fan.



Hardinge Brothers Machine Drive

Hardinge Brothers, Inc., Elmira, N. Y., manufacturers of precision machine tools and collets, have developed a moderately priced method of drive for their "Cataract" Bench Lathes, Hand Screw Machines and Milling Machines.

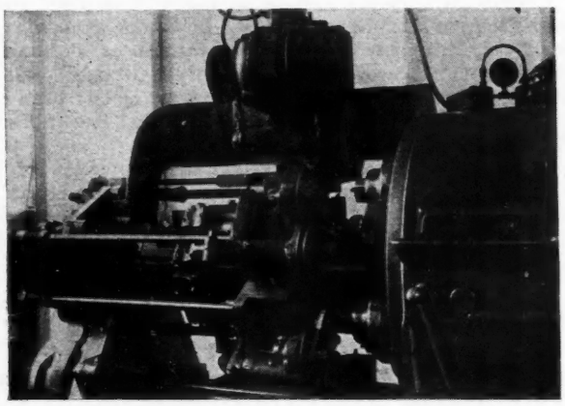
Expensive speed boxes, gear boxes, transmissions, countershafts, etc., have been eliminated by the application of a cushion-mounted two-speed reversible motor, the motor being entirely governed by a self-locking foot treadle operating "start-stop," "high-low," and "forward-reverse" controls. This motor, in conjunction with the machine cone pulley gives six forward and six reverse spindle speeds ranging from 340 to 1700 r.p.m.

The absence of gears is said to make the unit vibrationless and permit a smooth finish.

Baird Six-Spindle Automatic Lathe With Sanding Attachment

Since the introduction of the Baird six-spindle automatic lathe, The Baird Machine Co., Bridgeport, Conn., has been asked to design special tooling and adaptations of the machine for specific purposes. One important application is for turning, buffing and sandpapering in one set-up.

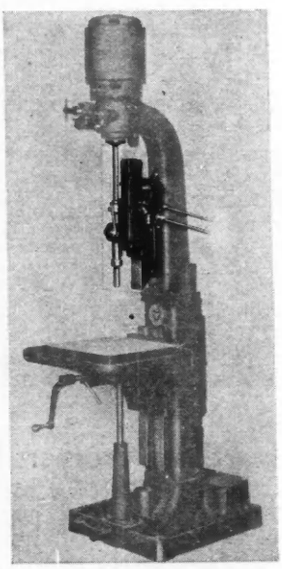
The illustration shows the tooling for a small electrical device consisting of a small metal part imbedded in a plastic. The metal portion is turned, sandpapered twice, then buffed. A fresh section of sandpaper is presented at each operation. The cycle occurs in one set-up, all automatically.



Leland-Gifford Hydraulic Feed

The sensitive drilling machines built by the Leland-Gifford Co., Worcester, Mass., may now be equipped with the same hydraulic feed that has been furnished for a number of years on the Unit-Cycle machine manufactured by this company.

This feed is applicable to both belt and motor spindle types, and is so designed that it can be applied to either new machines when they leave the factory or on Leland-Gifford machines now in customers' plants.



Leland-Gifford hydraulic feed

Either a continuous or a step-by-step control can be supplied for this hydraulic feed. When the operation is such that the drill does not have to be relieved in the hole because of the need for coolant or to furnish clearance for chips, the continuous feed cycle is furnished, while for drilling long deep holes in drop forgings and other tough materials, the step-by-step method of control is provided. The latter method insures the removal of chips from the hole at regular intervals, and at the same time, allows a flood of lubricant to enter the bottom of the hole. Long drill life between grinds, less drill breakage, straight hole, and high production are advantages claimed for this method in such operations as drilling long oil holes in crankshafts, connecting rods and king bolts.

Usually the maximum feed furnished is 6½ in., although when long holes are to be drilled, a feed of 10 in. can be furnished.

Lansing Industrial Gasoline Tractor

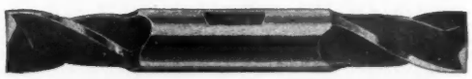
Two industrial tractors, a four-wheel model and a twin front-wheel model, both on the same chassis and powered with a standard model A Ford engine, are offered by the Lansing Company, Lansing, Mich. The drive axle is of full-floating worm design equipped with Timken bearings, the worm being mounted on New Departure ball bearings.

The design of the tractor follows truck chassis practice in the main. Engine, starter, transmission, ignition and cooling system are all adapted from the Ford model A. Consequently one of the chief claims for this machine is the availability of efficient, low-cost service wherever Ford dealers are found.

The four-wheel machine weighs 2170 lb. and is 82 in. long x 41 in. wide. It is provided with two-wheel mechanical brakes. Speed is about 20 m.p.h.

"Wel-Don" End Mill

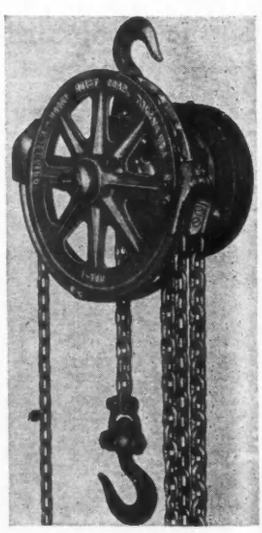
For the rapid production of keyways a special form of end mill has been designed by The Weldon Tool Co., 1426 W. Third St., Cleveland, Ohio. Its outstanding features are that it has cutting edges at the ends as well as at the sides, and that it has no center hole. It can therefore be fed downwards like a drill as well as horizontally. It is made double ended, thus greatly decreasing the cost compared with two ordinary single-ended mills, and also reducing sharpening delays.



The mill has only two flutes, and is recommended to be used at high speeds in order to get the best results. The flutes are of the standard "Wel-Don" hollow-ground type to assure efficient curling and prompt ejection of the chips. An added feature is the double "back-off" on the cutting edges instead of the single "back-off" commonly used on end mills.

Chisholm-Moore Al-Lite Safety Hoist

A recent addition to materials handling equipment is the "Al-Lite" safety hoist made by the Chisholm-Moore Hoist Corp., Tonawanda, N. Y. This is a light weight, heavy duty, high speed, spur-geared chain hoist of Alcoa aluminum alloy. It weighs 30 percent less than iron or steel hoists of similar design. One man can easily carry the "Al-Lite" and hang it in place. The ½-ton capacity complete weighs only 38 lb.



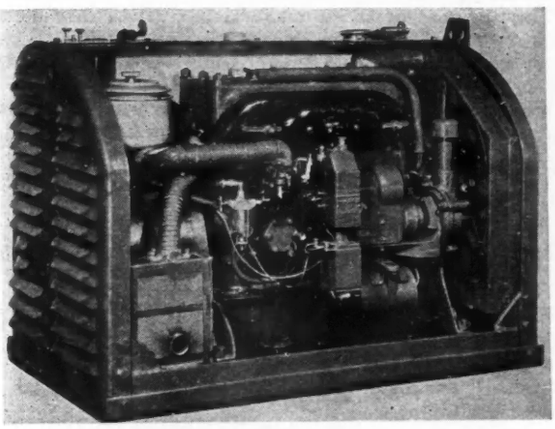
Al-Lite hoist

One of the exclusive features of this hoist is a safety overload governor which automatically warns against excessive overloading and acts as a protection for the workmen and material being handled.

The Alcoa aluminum alloy is said to insure a safety factor equal to steel or iron and, at the same time, provides unusual durability and permits high efficiency. Planetary gears operate in a grease bath in an oil-tight, dust-proof housing. The load is supported by ball bearings.

Ready-Power Chrysler-Engined Powerplant

An improved gas-electric powerplant, using a Chrysler engine has been placed on the market by The Ready-Power Co., Detroit, Mich. These plants have a two-fold purpose, they may be used to power new electric industrial



trucks or to replace the powerplants and battery equipment on electric trucks now in use in the factory.

Operating speed 900 to 1250 r.p.m. Housing dimensions, length, 40 in.; width, 24 in.; height, 27½ in. Weight, 1000 lb.

Improved Loadmaster Crane Unit Offered With Power Choice

Announcement has just been made that the Loadmaster, manufactured by Bucyrus-Erie Co., South Milwaukee, Wis., will now be available with either Case or McCormick-Deering power, and that the capacity of this crane has been further increased to 4500 lb.

It can be used as a stationary revolving-boom crane, as a crane traveling with its load, or as a tractor. Its mobility, compact design, and special equipment available make it extremely handy for both indoor and outdoor work.

Link-Belt Elevator Bucket

A design elevator bucket of Promal for heavy-duty work, said to be an improvement in cast bucket design, is announced by Link-Belt Company, Indianapolis, Ind.

This bucket, known as Style "AAP", is made in all the popular sizes, such as 8 x 5, 10 x 6, 12 x 7, 14 x 7, 16 x 8 and 18 x 8, and its principal features are summarized as follows:

It is claimed that the bucket, while weighing and costing a trifle more, will result in notable economies through its longer life, Promal in itself being stronger and more durable than malleable iron.

Kron Redesigned Scale

The Kron Co., Bridgeport, Conn., has just announced the completion of the redesigning of their entire line of Automatic Dial Scales, which includes Portable and Dormant Platform Scales, Bench Scales, Hanging Pan Scales, Track Scales, Hopper Scales, Crane Scales, etc.

The design of the indicating mechanism has been changed and greatly simplified. The number of bearings in the mechanism has been reduced to eight, six of which are grade ball bearings. The sector and pinion design is said to be such that no variation is possible in the mesh of the gearing.

Further development which makes for easier and more accurate readings is a device for absorbing vibration in the installation. This non-vibrating sector in no way affects the accuracy of the scale, but rather increases the efficiency of the mechanism inasmuch as the pointer will not vibrate and consequently can be much more easily read.

The entire dial head is completely sealed to prevent entrance of dust and moisture which might affect the scale mechanism. The dial head is also arranged to swivel 360 degrees so that it may be turned to allow accurate reading from any direction.

Blackman-Hill Slide Rule

A new shop calculator called "The Machinist's Slide Rule," has been placed on the market by Blackman-Hill & Co., Inc., St. Louis, Mo.

It was designed especially to aid the shop man in the proper use of modern machine tools with their great multiplicity of speeds and feeds, the great variety of materials to be machined and the many new high speed cutting tools to machine them with.

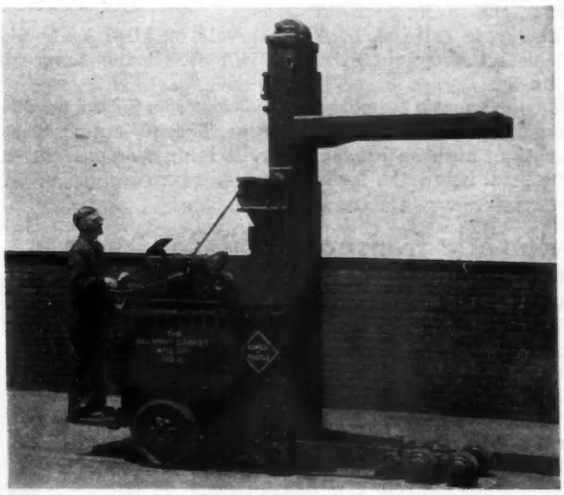
This pocket-size slide rule (7 x 2 x ¼ in.) will indicate quickly and accurately the proper speed for work, drill or cutter, the proper relative feed per tooth or per revolution or per minute in milling, drilling, turning and boring operations, and will also tell in advance the approximate power required for a given speed, feed and cut based on the cu. in. per minute metal removal.

Elwell-Parker Industrial Trucks

Several new industrial trucks have been developed recently by The Elwell-Parker Electric Co., Cleveland, Ohio. The first of these (illustrated) is a variation of the unit designed to handle Studebaker bodies as described in *Automotive Industries*, June 28, 1930. In this case the body is picked up on forks as before but there is the additional requirement of going under low doorways.

To accomplish this, the body is lowered by sliding forks to a position lower than the original pick-up position.

Fig. 2 shows one of the largest high lift trucks in operation today. Its capacity is 5 tons. It elevates to 106 in. and permits the transport of heavy dies through door openings only 88 in. high.



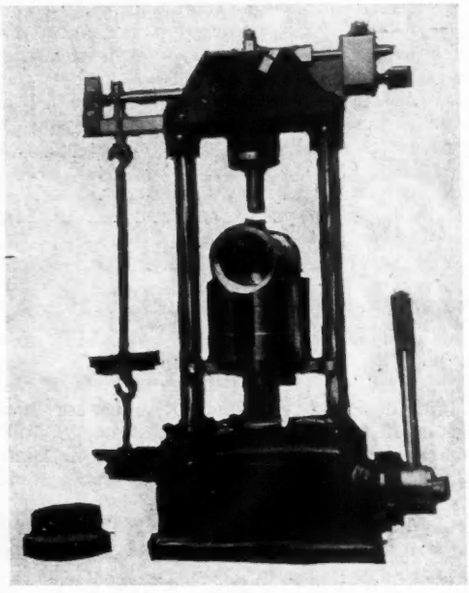
Coats Elasticometer

A method of gaging piston pin bores by weighing instead of measuring by ordinary means is offered by an application of the Elasticometer made by the Coats Machine Tool Co., Inc., New York, N. Y.

The machine is a standard R-80 "Elasticometer" Spring Tester except that the columns are extended to admit the vee-block or prismatic support for the piston. The upper compression platen carries a pin which pushes the piston pin through its bearing in the piston when the rack is moved upwards by pulling forward on the hand-lever.

Instead of one counterpoise, there are two. Counterpoise "2" (i.e., the lower one) is ordinarily supported by a projection on the left-hand side of the lower base housing. Its length is such that it does not become operative until the beam has reached or slightly passed its horizontal or balance position.

By means of several pre-tests, the pressure required for sliding and driving fit is determined by adding weights, or removing weights, from the counterpoise of the scale. After definitely establishing the upper and lower limit of permissible pressure for the desired fit, the tolerance weights are put on counterpoise 1 and 2. The stroke of the rack is set by means of an adjustable stop around the bushing of the hand lever. The stroke is set equal to the piston diameter. The hand lever is equipped with a friction cone and may be adjusted in any suitable position, convenient to the operator.



The scale ratio is 1:10 and pivots on steel knife-edges and vees. A weight of ¼ oz. will deflect the beam some ⅜ in.

Two prismatic supports for pistons from 2 in.-5 in. diameter are furnished with the machine. These V-supports must be rather high so as to permit driving the pin through some 2 in. below the lower piston pin bearing.

Automatic Transportation Co. Trucks

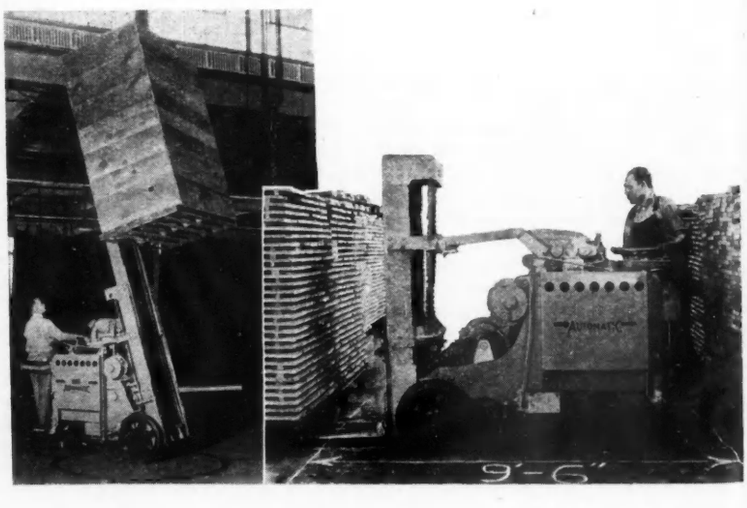
With production at its present low level, authority to purchase material handling equipment has been difficult to secure except where the particular machine is able to perform an entirely new handling operation or has operating characteristics not previously found in this class of equipment.

Of such character are the new telescoping and tiering fork trucks produced during the past year by the Automatic Transportation Co. Inc., Chicago, Ill. Until the development of these machines, the advantages of the fork truck (i.e., the elimination of the expense of skid platforms, the reduction of wasted storage space necessary for the platform of a lift truck and the ease of double decking loads) was offset by the fact that, with the load in the overhung position, this type of truck required considerably greater aisle space in which to operate.

The illustration, however, shows how entirely this difficulty has been removed, as these new trucks can turn in their own length and can operate in aisles 20 per cent to 30 per cent narrower than those required for the older types. This maneuvering ability is secured by driving the trucks from the front wheels and providing a steering mechanism which allows the rear wheels to be turned 87½ deg. The front wheel drive provides the added advantage that the greater the load, the greater is the weight on the driven wheels with a resultant increase in tractive effort and a decrease in the effort necessary to steer the machine.

The uprights of these machines are tilted forward and back by means of a positive crank arm holding the load securely in any position and providing a high speed with reduced speed at the beginning and end of the movement.

Where high stacking is necessary and yet low overhead clearances are encountered a telescoping type of upright is employed.



Wazau Small-Piece Tester

This machine, which is sold in this country by the Baldwin-Southwark Corp., Philadelphia, is designed for testing small pieces, such as wire, wood, porcelain, etc., in tension and compression, under transverse stresses and for Brinell hardness. It is of the gooseneck type, having a lever-pendulum weighing system. It is a self-contained unit of the direct-reading and recording type with five ranges of sensitivity, viz., 500, 1000, 2000, 5000 and 10,000 lb. The vertical opening is 0 to 20 in., while the distance between the axis of the specimen and the machine frame is 3 in.

The load is weighed by a double pendulum-lever balance on which patents have been applied for, we understand. In the high-load ranges both pendula are used together, while for small loads the lower pendulum is disconnected. This is claimed to afford two advantages, namely, that at small loads the friction is minimized, whereby the sensitivity is increased, and that the inertia effect is greatly reduced, by using two short instead of a single long pendulum.

The levers of the weighing system are supported in ball bearings, which is made possible by the use of ample lever distances.

Dial indications are proportional to the loads. An accuracy of plus or minus 1 per cent is guaranteed from 10 per cent of the capacity of each range on, the ranges ordinarily being 1/10, 1/5, ½ and 1/1 capacity. The actual accuracy is said to be even higher. A maximum hand, which indicates the greatest load reached in a test, is also provided for.

The machines are ordinarily equipped with a stress-strain recorder, which is not shown in the photo.

In transverse tests, the upper crosshead takes the loading tool, while the lower crosshead carries the supporting beam with 36 in. maximum span. A similar arrangement is used in Brinell and buckling tests.

Net weight is 450 lb.

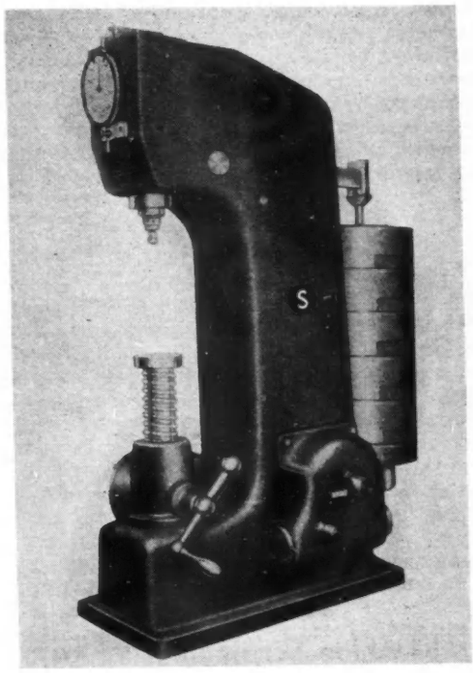
Steel City Brinell Machine

An automatic direct reading Brinell hardness tester has been placed on the market by the Steel City Testing Laboratory, Detroit, Mich.

The Model UK-300 hardness tester is made as a production testing machine with electric drive, push button control, and the accomplishing of a test and releasing of a load is automatic. However, for laboratory and occasional checking of specimens a hand-operated type can be supplied. All models can be used for making Brinell Tests from 250 to 3000 kilograms, making the machines available for testing small specimens as well.

The maximum vertical opening for specimens is 11½ in. and the throat depth from center of specimen table to housing is 4¾ in. The head of the specimen table is so constructed that special adapters of various shapes to suit the specimens can be mounted.

It is equipped with an accurate direct reading instrument which indicates in increments of 1-500 millimeter for all tests. It features the positive dead weight system.



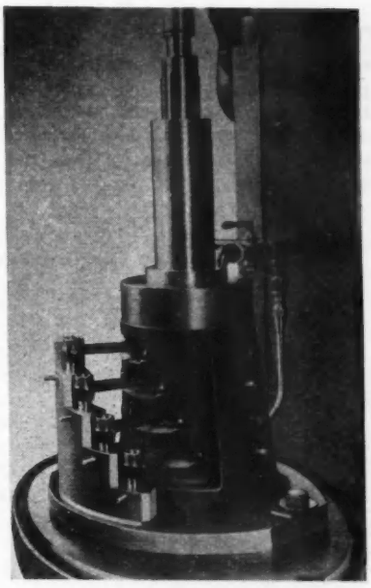
Micromatic Multiple Honing Fixture

Because the connecting rod of one of the largest producers of V-8 engines has a floating bearing, the problem of finishing accurately but at low cost was a serious one. It was met by an unique honing method and fixture conceived and patented by the Micromatic Hone Corp., Detroit, Mich.

While the features of construction and operation of the Micromatic honing tool and fixture are radically new, all of the basic principles of honing are maintained. The general difference, in this case the work is floated while the tool is piloted and, at the same time, a number of pieces are honed simultaneously.

The new method allows each piece of work to float independently of another so that there is no effect from accumulated error given by previous machining operations. The pieces are centered and held in perfect alignment on resilient wiper guides mounted in the body of the honing tool, in such a manner as to obviate the necessity for clamping or locking.

The honing stones are floating in relation to the body of the tool and the work so as to compensate for any uneven stone wear and prevent the abrasive sticks from disturbing the alignment provided by the wiper guides.



The tools are mounted on a Barnes No. 204 Hydraulic Machine, fitted with automatic stock counting device, and large pump to feed the coolant to the intake on the fixture.

Mathews Roller Conveyor

A summary of the new features and improvements in the line of heavy duty gravity roller conveyors is found in an interesting booklet issued recently by the Mathews Conveyor Co., Ellwood City, Pa. One of the outstanding features of the line is the type 100B heavy duty rollers which have a continuous load rating of 8000 lb. per roller. Another important development is the labyrinth seal which protects the bearings from dust, grit and dirt, thus making possible the trouble-free performance of the conveyor in foundries and other places where dust and dirt predominate.

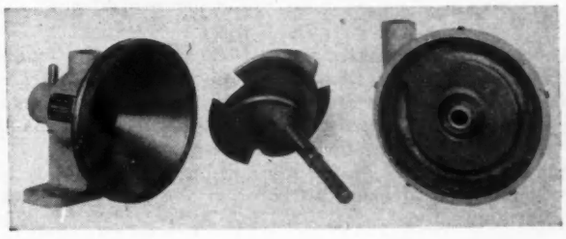
Tomkins-Johnson Spiral-Flo Pump

The new Spiral-Flo pump developed by the Tompkins-Johnson Company, Jackson, Mich., has been designed to eliminate the necessity of closely fitting and closely machined parts within the pump chamber and at the same time provide efficient operation.

The pump is supplied with ½ in. intake and ¾ in. outlet to provide seven gal. per minute capacity at 1000 r.p.m. and 14 gal. per minute capacity at 1725 r.p.m., or with one in. intake and one in. outlet capable of 31 gal. per minute at 1725 r.p.m.

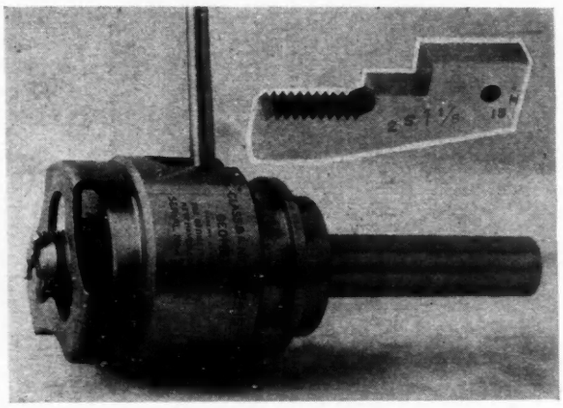
Ball bearings provide quiet, free running action and are protected by standard oil seals. Alemite pressure lubrication fittings are provided throughout. Since there is no appreciable back pressure, no relief valve is necessary. No check valve is necessary. The pump needs priming only when first installed. The cap to which the discharge connection is attached may be rotated to any desired position on the housing.

The Spiral-Flo pumps either water or oil or any combination of the two efficiently and is not affected by grit, chips or foreign matter which may enter it.



Geometric Collapsing Tap

The Geometric Tool Co., New Haven, Conn., is presenting a new collapsing tap for small hole tapping. While the chaser construction and front end operating mechanism differ from similar features in the standard line of this company, the smaller tool has many features in common with "S" taps.



The "SL" tap, as the new line is designated, can be used in live spindles or stationary holders without the purchase of additional parts.

The chasers are sturdily made and the tap is designed to make possible tapping to a shoulder or to a bottom without the use of special overhanging chasers.

Ryerson New Bearing

Joseph T. Ryerson & Son, Inc., Chicago, have announced a new bearing made from synthetic resin similar to bakelite and with textile material as the base. The strong belting textile material reinforces the resinoid, which completely fills and saturates it. The composite material is then subjected to great heat and pressure. At approximately one ton pressure per square inch and 340 deg. F., the product sets.

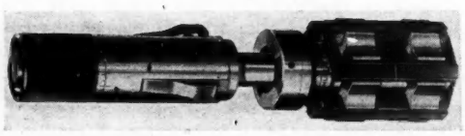
The physical characteristics are entirely changed and the bearing is no longer fusible or soluble. It cannot be resoftened by heat, will not absorb water or oil and is resistant to most acids. It is, however, attacked by hot caustic alkalies.

Ryertex will show a Brinell reading of about 30-40 and a Sclerescope reading of 70-80.

Hutto Automatic Drivehead

An automatic drivehead to be used in conjunction with the standard Hutto Production Hone has just been announced by Hutto Engineering Co., Inc., Detroit. It has been developed for the purpose of providing faster stock removal, greater accuracy, maximum stone life and higher quality of finish.

All the well-known Hutto features have been included in this drivehead, such as full-floating mechanism to compensate for uneven stone wear; rigid type expansion medium and automatic stop control.



Another feature of the new drivehead is the automatic contraction and expansion of the hone as it is withdrawn from and inserted into the bore of the work. Much time is saved thereby as the necessity of contracting and expanding the grinder manually is eliminated.

One major setting of the micrometer adjustment is all that is required to grind all bores of the same diameters to equal limits.

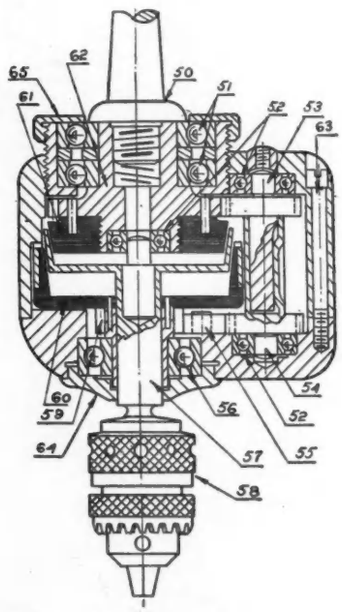
Jarvis Production Tools

A number of interesting tools and attachments for the automotive plant have been brought out by The Charles L. Jarvis Co., Gildersleeve, Conn. The Biax No. 0 tapper, illustrated, has a capacity of ¼ in. in steel and on a production test, averaged 4000-3/16 in. holes per hour.

This attachment is ball-bearing throughout, and capable of 3500 r.p.m. maximum. The chuck is a new Jacobs double-grip designed to hold the square as well as shank.

Another product is the Biax heavy-duty flexible shaft No. 19 suitable for attachment to any motor drive for sanding, grinding, filing and polishing. The standard shaft is 6 ft. long, ½ in. diameter, with ball-bearing couplings at both ends. It is suitable for motors of ¼, ⅓, ½ or ¾ hp. capacity and any speed up to 4000 r.p.m.

This company also offers a self-contained bench model machine known as the type FJA for filing, grinding, sanding and polishing. It is equipped with a 3/8 in. Biax core, 42 in. long. Speed range 1000, 2000, 4000 and 7000 r.p.m. Drive is by a ⅓ hp. ball-bearing motor, 40 deg. repulsion induction type.

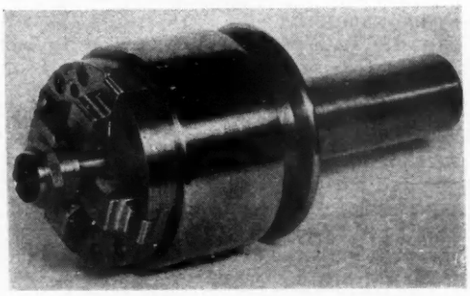


The Biax tapper made by the Charles L. Jarvis Co.

Eastern Machine Screw Internal Trip

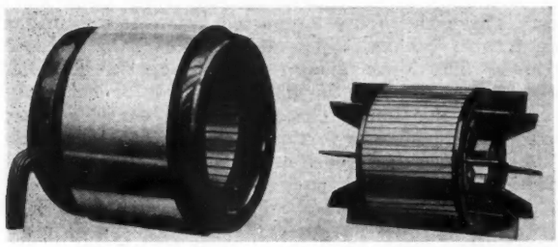
An interesting development in connection with the insert chaser type of self-opening die head recently developed by the Eastern Machine Screw Corp., New Haven, Conn., is the design of a new type of internal trip. It is especially applicable to the threading of the new metric thread spark plug shells where a full thread is required close to a shoulder.

The small size of the insert chaser permits fingers, as shown in the illustration, to reach out between the chasers. The instant these fingers touch the shoulder of the plug, the die head trips with no strain on either the chasers or thread. These fingers simply release the energy in two auxiliary springs and cause the outer sleeve to fly back and trip the die head instantaneously.



Louis Allis Reversing Squirrel Cage Motors

Rapid reversing squirrel cage motors, capable of as many as 60 reversals per minute continuously without overheating, have been perfected by The Louis Allis Co., Milwaukee, Wis. Considered impossible until recently, such high rates of reversals have been made practical through light-weight rotor construction, efficient ventilation, high torque characteristics, and shock-resisting cast iron frames. In fact it now seems practical to build motors for at least 100 reversals per minute.



First applied by the Louis Allis Co. in 1904 to reverse laundry washers 4 to 6 times per minute, reversing motors now are available for practically all machines that utilize fast reciprocating or reversing motions or frequent starting and stopping. Radically improved performance has been incorporated in such machines as tappers, threading machines, broaches, planers, slotters, and millers by eliminating shifter clutches, tripping mechanisms, gears, and belts, formerly needed to reverse the spindles.

Barnstead Automatic Water Stills

A complete line of automatic water stills for laboratories and production processes in the automotive industry is offered by the Barnstead Still and Sterilizer Co., Inc., Boston, Mass. The following units are now available:

(a) Gas-heated full-automatic-controlled distilled water systems consisting essentially of a water still, a distilled water storage tank and the Barnstead self-starting-stopping-flushing controls. By means of full-automatic control the still automatically starts operation when the water in the storage tank drops to a predetermined low level, and automatically discontinues operation when the distilled water reaches a predetermined high level; the evaporator of the still then being automatically drained of sediment.

(b) A gas-heated still of 10 gallons capacity (10 gallons distilled water per hour) now built in one unit.

(c) Perfected automatic low water cutoffs at low price for electrically-heated stills, to safeguard the heating units in the evaporator when, for any reason, the feed water supply is shut off while the current is on.

(d) A somewhat similar set of automatic protective low water cutoffs for gas-heated stills.

(e) The extending of the line of electrically-heated stills up to and including stills of 50 gallons hourly capacity.

Heretofore the largest-capacity electrically-heated still manufactured had a capacity of only 10 gallons distilled water per hour.

Titeflex Tubing for Machine Tool Oil Lines

According to a recent announcement by the Titeflex Metal Hose Co., Newark, N. J., this well-known all-metal tubing is being adopted for use as a flexible connection on the oil lines of many types of machine tools. It is used to carry both the lubricant for the machine and cutting fluid for tools.

Two recent applications are the Brown & Sharpe screw machine and the Bullard Multaumatic.

As is well known to automotive engineers, this tubing is characterized by its ability to transmit relatively high pressures, ability to withstand extremes of temperature, and trouble-proof under conditions of severe vibration.

Titeflex is supplied in all standard sizes pipe.

Lyon Metal Products Tool Kits

Lyon Metal Products, Inc., Aurora, Ill., has designed a new assembly repair kit with removable tray designed to carry a great variety of small parts and fittings. This tray is especially useful when doing upholstery work or body finishing, as the great variety of small compartments are built to carry screws, bolts, cotter pins, lock washers, and miscellaneous small parts. There are 26 small compartments for these fittings with two large compartments for tools.

Dimensions 20½ in. wide, 12 in. deep and 3½ in. high, with convenient handle.

Pasco Copper Co. Alloys

Cerro de Pasco Copper Corp., 44 Wall Street, New York, N. Y., producers of low-melting alloys of bismuth for various purposes, have developed a new composition called Basaloy. It is recommended as an alloy for proving forging dies and as a liquid seal in heat treating for certain types of nitriding and bright annealing furnaces.

Basaloy is fairly malleable, somewhat ductile, harder than lead, low melting, and non-shrinking. It makes a good clean impression, and can be used over and over again as it does not change in composition in repeated melting. The alloy is liquid down to 257 deg. Fahr. (125 deg. C.) and has a specific gravity of about 10, thus making shallower seals possible.

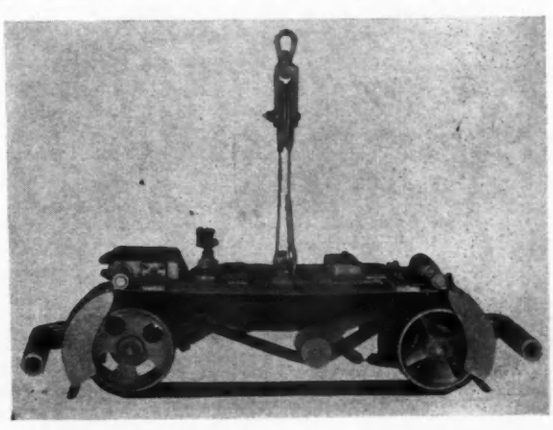
For automotive needs this makes a valuable companion product to Bendaloy, used in bending tubing, and Matrix-Alloy, used for attaching loose pieces in punch and die construction. Both products were described completely in recent issues of *Automotive Industries*.

Buckeye High Frequency Portable Tools

The Buckeye Portable Tool Co., Dayton, Ohio, manufacturers of Hercules Portable Tools, are broadening their line by the introduction of several new high frequency electric portable tools. A specially designed high frequency motor is being used.

The new high frequency belt sander (model No. 352-E) features a single motor drive. Finding it impossible to synchronize two electric motors, Hercules engineers designed this tool to operate with one motor. It is used for smoothing down welds; sanding auto bodies; smoothing up large steel dies; finishing metal, wood and stone surfaces. It is operated by one man, and is suspended over the job by a cable. An interesting feature of this belt sander is that it is air cooled by compressed air, which also prevents any dust or grit from getting into the motor. Compressed air is also used for the automatic belt tension. Belts are 2¾ x 5½ in. By the use of a belt idler it is possible to use manufactured abrasive belts over an endless leather belt. However, canvas coated belts are used with the addition of guide rolls; but a smoother finish is claimed with the use of manufactured belts. Speed is 4500 r.p.m.

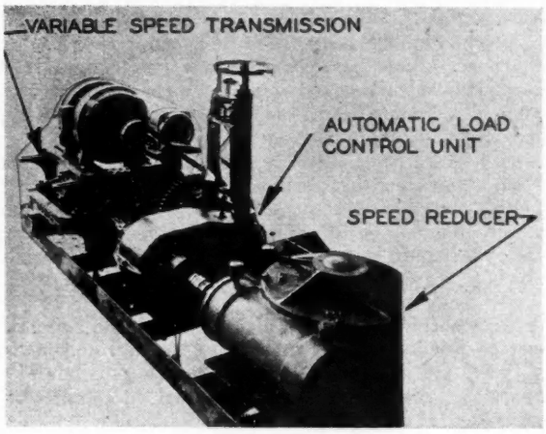
This grinder is used on weld seams, and for surfacing large castings, as well as for grinding dies and flat metal.



Mechanical Handling Systems

Mechanical Handling Systems, Inc., Detroit, Mich., has just placed on the market (patents pending) an automatic load control for conveyor drive units and the like which can be used either as a means for stopping the conveyor in case of a jam, or as a device for synchronizing multiple drive units when the conveyor is driven at more than one place. For this latter purpose its use extends far beyond the conveyor field and can be used any place where it is necessary to synchronize the speed of multiple drives.

The device is used in combination with a variable speed transmission, and, in accordance with a predetermined load variation, automatically speeds up or slows down

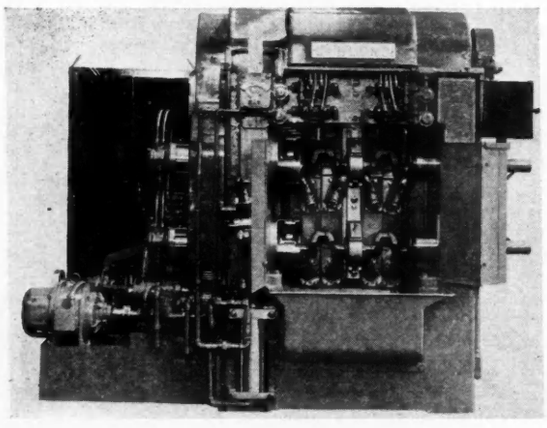


the drive. This is accomplished through a balancing arm installed between the variable transmission and the reduction unit. This balancing arm is counterweighted to sustain the normal conveyor load. When this load varies up or down, the balancing arm reacts immediately upon the electrical remote control device, which regulates the speed of the variable transmission. This arm is so sensitive that a fractional variation in load is measured at once and compensated for. When used as a safety device, any dangerous increase in load imposed on the machine or conveyor, due to accidents or other reasons, will cause the balancing arm to operate a limit switch, cutting off the power.

LeBlond Crankshaft Lathe

A new two-spindle crankshaft lathe has been developed by the R. K. LeBlond Machine Tool Co. of Cincinnati, Ohio. This machine is designed to face the webs on two crankshafts simultaneously. A machine of similar design but equipped with a driver on both ends may be used for turning the pin bearings. The cranks in the machine illustrated are driven from the web adjacent to the flange end by pot-type chucks.

The chucks are mounted on large-diameter, forged-steel spindles, which roll on roller precision bearings. They are hydraulically operated, securely clamping the crank on the flange end line bearings. The cranks are located in the chucks from milled spots on the adjacent web. The stub end is supported by a heavy spindle which carries a hardened and ground sleeve mounted on roller bearings. The cranks are supported on the center line bearing by heavy steady rests, which are mounted on a cast-iron plate anchored to the base of the machine and also to heavy tie plates which hold it in alignment.



The tool slides are large cast-iron plates with hardened and ground steel bearing plates mounted on the sides. These slides are supported between exceptionally large master cranks, which are supported by three line bearings. The lower master crank supports the weight of the tool slides, and the upper crank is connected to it by a connecting link. The tool blocks carry horizontal type tools. However, a vertical bit tool block could readily be substituted. The tools are fed to depth by rocking the heavy cradle which carries the upper master crank. Any desired feed may be obtained at any part of the cut by using the proper design cam. At the end of the cut the tools are automatically traversed to the loading positions.

All of the chucking controllers are interlocked with the electrical circuit in such a way that it is impossible to start the machine if the cranks are not properly chucked.

"K" Lo-Swing Lathe

Automatic loading and unusual design feature the model "K" Lo-swing lathe brought out by the Seneca Falls Machine Co., Seneca Falls, N. Y. It is designed primarily for short, stubby work such as ball-bearing races, gear blanks, and the like that can be handled on an arbor or in a chuck.

The arrangement shown here takes races from $^{15}/_{16}$ to 5 in. in diameter.

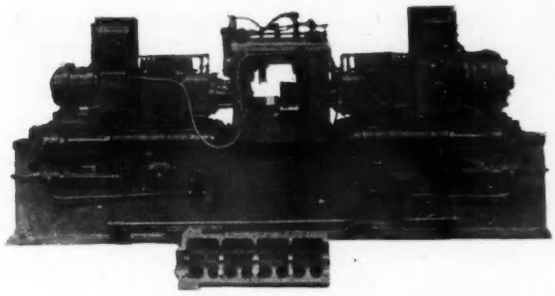
It is equipped with an automatic device arranged to load roller bearing races onto a stub arbor where they are held while being machined. After the race has been completed, it is ejected from the stub arbor hydraulically and separated from the chips, which fall into the chip truck. The races are conducted through the chute into the square hole over the wheel of the chip truck. A tote box or other receptacle can be placed here for finished work. The entire loader is operated hydraulically and safety features are incorporated to protect machine in case of accident.

This machine is of heavy design, weighing approximately 8700 lb., and is built for high speed, it being practical to run the spindle up to 2000 r.p.m. if desired. Anti-friction bearings are used throughout and all shafts and gears that are subjected to any amount of wear are hardened so that long life and low maintenance cost is assured.

Baker Brothers' Oilfeed

To meet the current needs for production equipment Baker Brothers, Inc., Toledo, Ohio, have developed two horizontal, oil-feed way machines, thus completing a new series of three sizes of way machines consisting of a small size, No. 4-HH, previously introduced, a medium-size machine, and a heavy machine, illustrated. Simplicity of design, with the use of standard parts or units where possible, has been the aim in the development of this line. Owing to the rapid change in designs, the trade requires productive equipment which will be flexible to change over. Flexibility has been incorporated in these new machines as a careful study of photograph shown will prove.

Standard saddles are mounted on each end of the machine, arranged with drive brackets which serve as a drive to the multiple spindle heads. Heads to suit work are mounted to the front facings of these drive brackets. This design and mounting allows for change to new heads at a minimum expense. Further, the machine bed itself is made of sufficient length, with plenty of head travel to allow the use of the machine for work which



may require more clearance between spindles. Both of these features assure user of the fact that if, by any chance, his present job is obsoleted, the machine can be adapted to other work.

Each end of the machine has its own individual oil feed unit. Each end also has the Baker feature of "Twin Pull" feed, with two cylinders out in the open, with packing gland adjustment accessible for quick adjustment.

All machines are arranged with automatic cycle, being started by means of foot treadle placed conveniently at the front. Cycle control trip blocks are placed on the saddles in accessible position for change. Feed can be changed by means of two metering valves, one at each end. A movement of lever changes feed to suit conditions.

The illustration shows the No. 8-HH machine set up for drilling from two ways, 16 valve holes in an eight-cylinder block. Suitable conveyor is provided at front of machine for sliding the work into place in fixture. After work is in the correct position the operator moves the lever on top of fixtures controlling the oil valve, automatically locates block in proper position and clamps. The machine is then started and the two heads rapid traversed to the cutting position, bringing the tool support bushing plates into the work close up to the start of the cut. Feed is automatically engaged and the operations performed, the heads then returning to the rear position.

The No. 6-HH machine was furnished for drilling the ⅝-in. diameter oil hole which runs lengthwise through the motor block. Each opposed head on this machine is arranged with two spindles so that two blocks are produced at each cycle of the machine. Care has been taken to provide the proper type of support for this long drill.

McCrosky Block Type Boring Bars

A line of block type boring bars for a variety of production needs has been placed on the market by the McCrosky Tool Corp., Meadville, Pa. The tools employ an improved method of locating and locking the block in the bar. A key in the bar has a tapered V that locates and locks the block by engaging a V in the front. By adjusting the position of this key the block can be either locked rigid or made to float any desired amount. The design of the key permits the contacting faces on the V to be altered easily to bring the block central in the bar in case the bar is sprung out of line while in use.

The cutting thrust is not taken by the locating key but by a hardened thrust block between the cutting block and the rear wall of the slot.

Blades are made from high grade high-speed steel. Stellite blades and blades tipped with tungsten carbide or tantalum carbide also can be furnished.

Standard blocks are available in five series with a total range of 1¼ to 12 in.

Hammond Variable Speed Polisher and Buffer

A new polishing and buffing lathe featuring variable speed by means of a special speed-changing pulley is offered by Hammond Machinery Builders, Inc., Kalamazoo, Mich. This machine is said to introduce some radical changes in polishing equipment, meeting the modern demand for variability of speed to meet varying requirements, and to make full use of wheels as diameter is decreased through wear. The new Hammond machine employs a V-belt drive and the Hammond Patented Pulley, which provides a wide range of speeds which may be changed easily and rapidly. Any speed within a 50 per cent increase of the rated low speed of the machine is available; for example, speeds ranging from 2000 to 3000 r.p.m.; from 1800 to 2700; from 1500 to 2250. Changes as small as 25 revolutions are possible. By using a Hammond Variable-Speed Pulley on the drive motor as well as on the lathe spindle the range of speed variation can be further increased; also by changing to another size pulley on motor.

The standard machine of this type has a variable-speed pulley on the spindle with solid sheave on motor. Changes in speed are made by expanding or contracting the special pulley to a Vernier scale letter and corresponding speed figure on a speed chart directly in front of operator.

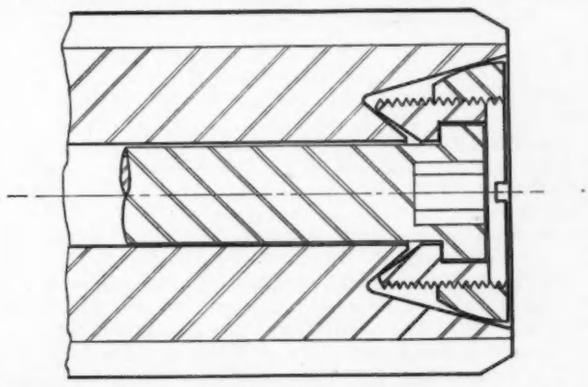
Armstrong Armide Cutting Tools

Armide, an improved type of carbide alloy cutting metal, has been placed on the market by the Armstrong Bros. Tool Co., Chicago, Ill. It is said to remain cool and securely brazed, though its cutting edge runs red hot, because of its low thermal conductivity. The edge remains smooth and clean, because it will not alloy with steel or iron. This characteristic prevents "grooving," one of the prime causes of cutting edge breakdown.

These tool bits come in forms suitable for Armstrong tool holders, not only for the machining of unusual materials, but for general shop work as well.

Goddard & Goddard Reamer

The Twin Lock Expansion Reamer was designed by Goddard & Goddard Co., Inc., Detroit, Mich., to meet the need for a plug type tool having simultaneously greater rigidity and greater adjustability, this tool providing expansion life of from 0.050 to 0.100 in. in sizes up to 1½ in. diameter. The tool is adjusted by slightly loosening the center screw, changing the relationship of the two threaded cone nuts and tightening the center screw, which pulls the cone nuts to their seat in the slotted reamer. The change in reamer diameter depends on the relationship of one nut to the other, as one serves to pull the reamer together, while the other spreads it. Thus, when tight, a rigid tool is offered, with no possibility of change



of diameter caused by blades either spreading or closing in. Means are provided for adjusting the two cone nuts in place on the tool.

The body of the tool is an alloy heat-treated steel, with the high-speed tips welded in place. Slotting is of such length as will throw the strain of bending, due to adjustment, in the body material rather than the hardened high-speed tips. In fact it is claimed that the quality of finish equals that of a solid reamer of equivalent rake and spiral. Tungsten Carbide, Stellite, etc., require tool set-ups having extreme rigidity; this tool may be safely tipped with such materials because the positive locking eliminates flutter within the reamer itself.

Hose for Pressure-Lubricating

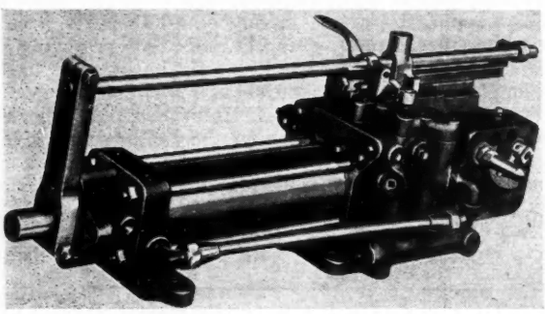
The Armored Tube Co. of Malden, Mass., has developed a new flexible hose which is claimed to possess superior advantages for use in high-pressure lubricating systems. The rubber used for the manufacture of this hose is said to be more resistant to the action of grease than rubbers used for the same purpose heretofore and since the hose has an internal diameter of ¼ in. there is no danger of it becoming closed by swelling of the rubber. Moreover, the large size of the hole permits of more rapid lubrication. To enable the hose to resist the high pressures used in pressure lubrication, the rubber tubing is wound with several layers of steel wire and cotton. The bursting pressure for this hose is said to be about 12,000 lb. per sq. in.

Vickers Control Panel

The Vickers Control Panel, supplied by Vickers, Inc., Detroit, Mich., accomplishes virtually any possible combination of automatic feeds and rapid traverses. It includes all the equipment necessary to the hydraulic circuit except the pump and cylinder. A minimum amount of piping is required: two lines from cylinder to panel, one line from panel to pump, and a fourth line from panel to tank.

The standard panel is 14½ in. wide x 13½ in. high, but these dimensions can be varied to suit practically any requirements. It not only saves space, but also improves the appearance of the machine and is easily applied.

The feed rate is governed by positions of plungers. When "A" is pushed down by a stop attached to table, the feed rate is increased and remains at that value until it is decreased or further increased by another stop pushing down "B" or "A." These two plungers are so arranged



that when either is depressed the other rises an equal amount.

At end of stroke a stop depresses another plunger which controls pilot valve and causes rapid return of table to original position. If a stop is provided at this point to depress plunger "D," the operation will be continuous—otherwise machine stops at completion of cycle and must be restarted manually by the shifting lever.

To vary the rate of any working stroke or rapid traverse, simply increase or decrease the height of stops that engage "A" and "B." The points at which changes in feed rate occur are quickly varied by shifting positions of stops.

The four plungers are staggered so that stop used to engage any one cannot contact the other three. Lever "X" is a manual control for regulating the feed rate; it is used only in setting up the job.

Palmer-Bee Carryall Conveyor

The Carryall Conveyor, built by the Palmer-Bee Co., Detroit, Mich., is comparatively new but because of its unique construction and universal application, and because it combines the merits of several conveyors in one, it is said to occupy a prominent position in the industrial conveyor field.

The Carryall is a single, endless-chain conveyor, with four-wheel or two-wheel load-carrying trucks spaced at suitable intervals, and is practically unrestricted as to length or direction. It is also made as a continuous steel belt of any required width.

The Carryall permits the load to be carried on top of the conveyor similar to the belt or platform type, but with the advantage that it can operate any length or direction required without transfer. It has the added advantage that every foot of conveyor can be used for transportation.

Bronze bushed transverse joints are used in each load-supporting attachment to enable the conveyor to rise or dip to different levels. The roller-bearing wheels run loose on the ends of a fixed axle and the axle is radial to the center of all horizontal curves, avoiding friction and sliding action on the wheel treads.

In automotive plants this conveyor has been built in various lengths up to 3000 ft., and for individual loads varying from light packages up to 10 tons.

Vickers Automatic Hydraulic Feed

An automatic hydraulic feet unit for step-drilling deep holes has been placed on the market by Vickers, Inc., Detroit, Mich. In one automobile plant the unit is drilling a 3/16-in. hole 5½ in. deep, 2 min. floor to floor time, in 0.35 carbon alloy steel.

One man operates three machines. Drills are resharpened every 35 holes, while the previous rate was 8 or 10 holes per resharpening. Drill breakage has been almost entirely eliminated—runs of two weeks without breakage have been experienced.

The cycle of operation is entirely automatic—operator simply starts the job by moving lever D to "on" position. The drill approaches at rapid traverse and goes into feed just before striking the work; after drilling a predetermined depth (regulated by setting of B), it reverses and backs out at rapid traverse to its original position. The drill then again approaches at rapid traverse and goes into feed at a predetermined distance (regulated by setting of C) from bottom of hole and drills the second "step" (also to depth determined by B). This sequence of operations continues until hole is the required depth when adjustable stop E trips D to "off" position; this returns drill to starting position and resets all controls to await work change by operator.

G-M Laboratories Photoelectric Relay

A new, low-cost photoelectric relay, the Foto-Switch, for experimental, industrial and scientific use, is announced by G-M Laboratories, Inc., 1735 Belmont Ave., Chicago. This unit embodies an electro-magnetic switch which is opened or closed by the interruption or variation in the illumination on the photoelectric cell. With the Foto-Switch, electrical devices, such as motors, electric signs, signals, or alarms, can be controlled.

Photoelectric equipment is used in manufacturing operations for counting and sorting the various parts in process. It is also used in the measurement of headlight characteristics and the distribution and range of the projected beam.

Federal Precision Dial Indicator

An unusual type of dial indicator for precision measurement is offered by the Federal Products Corp., Providence, R. I. It is known as the model 82, having a range of 0.020 in. calibrated 0-5-0 or 0-10. It is graduated in 1/10,000 (0.0001) in. and is said to be unique for an instrument having this range in that the spindle operates through the center of the back instead of through the side.

This model is available either with plain or jeweled bearing movement.

What Has Gone Before—

Being a detailed review of machine tools, small production items and shop equipment announced just prior to the Production Issue of Automotive Industries

Fellows Gear Measurer

Fellows Gear Shaper Co., Springfield, Vt., offers a gear-measuring machine incorporating many interesting and unusual features. It comprises a substantial pedestal upon which is mounted a rotatable table. The work is held on a vertical work-arbor, and the fixture carrying the measuring instruments is located on top of the table. Its capacity is from 2 to 7 in. P.D.

The fixture which carries the dial indicator and the various inspection units is so made that it can be moved about on the table when measuring involutes; fulcrumed to the table when inspecting circular pitch, lead, pitch diameter and eccentricity. (Page 190, Aug. 6.)

Norton Surface Grinder

A hydraulic-operated automatic cross feed or wheel traversing mechanism is now offered by Norton Co., Worcester, Mass., for their 10 x 12 in. surface grinding machines. Maximum efficiency from the grinding wheel is obtained, since the wheel can be fed across the work at each reversal by increments that utilize the full width of the standard 1½ in. wheel.

The mechanism is adjustable and provides any feed from 1/16 in. up to 1½ in. and the direction of the wheel traverse is automatically reversed by the use of dogs which can be set to accommodate any width of work up to 10 in., the capacity of the machine.

The hand feed wheel, when used, is held in against a spring and is automatically disconnected when power cross feeding. (Page 472, Oct. 8.)

Grand Rapids Grinder

A motor-driven surface grinder, No. 0, for fine, accurate work has been placed on the market by Gallmeyer & Livingston Co., Grand Rapids, Mich.

It is available on a column or it can be furnished in bench type.

The table is 5 x 29 in. overall with a 5 x 12 in. working surface. Longitudinal table travel of 12 in. is provided by rack and spiral pinion and actuated by a conveniently located hand wheel.

This spiral pinion gives a smooth, even action to the table and the conveniently located hand wheel makes it possible to use great rapidity in grinding. (Page 471, Oct. 8.)

National Helicoid Grinder

An automatic radial helicoid grinder for producing staggered-tooth helical gear-shaped cutters has been placed on the market by the National Tool Co., Cleveland, Ohio.

The machine will generate a radial helicoid cutting face either normal to the axis or at an angle, and will produce a hook or an undercut as desired. (Page 220, Aug. 13.)

Landis Grinding Machine

The 10 in. x 24 in. motor-driven universal grinder announced by the Landis Tool Co., Waynesboro, Pa., is designed for the grinding of a variety of light parts manufactured in small lots and for practically all types of tool room work.

The headstock drive motor is mounted on a hinged plate, the position of which may be quickly changed in order to maintain proper belt tension. Six work speeds are available. (Page 284, Aug. 27.)

Universal Milling Machine

A vertical spindle Universal milling machine which is said to be a distinct departure from the usual types and which operates on an entirely new principle has been placed on the market by Sleeper & Hartley, Inc., Worcester, Mass.

All electrical controls are of the pushbutton or controller-box types, located so as to be most convenient, while the gear shifts are controlled from either side of the machine. In addition, cross-feed controls are located at the head. (Page 224, Aug. 13.)

Sundstrand Rotary Rigidmil

The Sundstrand Machine Tool Co., Rockford, Ill., No. 3B Rotary Rigidmil is equipped with a 2-spindle head and a 24-in. diam. rotary table, also with an auxiliary drum cam unit to oscillate the table 5/16 in., timed for 10 oscillations per revolution of the table.

The radius is formed in the skirt end of the piston by the cutter on the horizontal spindle and the 1/16 in. saw slot is machined by means of the cutter on the vertical spindle.

The rotary table is timed to rotate 1½ revolutions per minute to obtain a production of 900 pieces per hour. The vertical spindle revolves at 760 r.p.m. and the horizontal spindle at 610 r.p.m. (Page 410, Sept. 24.)

Thor Universal Electric Drills

The Independent Pneumatic Tool Co., Chicago, is now manufacturing two new electric drills—a ¼-in. size, with grip switch, known as USA, and a ½-in. size, with side switch, designated as URA.

The switch is of the double-pole type and breaks both sides of the line at the same time, thereby disconnecting the current from the line to the motor. (Page 224, Aug. 13.)

Ex-Cell-O Boring Machine

Motor boring units and holding fixture used on the Ex-Cell-O Precision Boring Machine, Style No. 216, designed for boring a ⅞ in. diameter and a 2⅝ in. diameter hole in steel hubs in Bakelite canvas timing gears and a ⅝ in. diameter hole in motor end frames have been released by the Ex-Cell-O Aircraft & Tool Corp., Detroit, Mich.

When boring the large diameter bore the estimated production is approximately 72 gears per hour. (Page 442, Oct. 1.)

Reed-Prentice Fixture

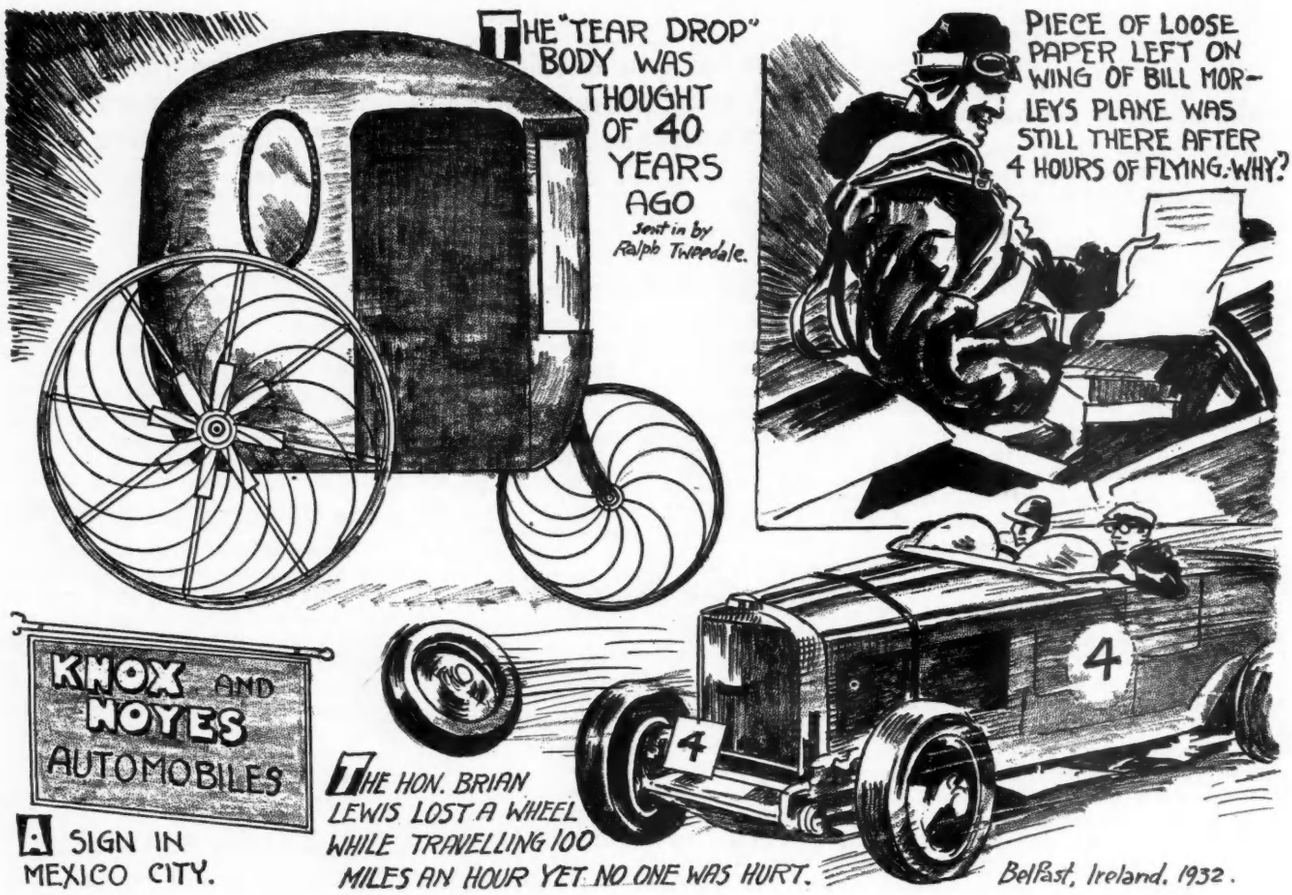
The Reed-Prentice Corp., Worcester, Mass., offers a universal fixture for laying out work as well as manufacturing drill fixtures with holes up to ½ in. in diameter.

It is made in two sizes only, one with a 12 in. diameter rotary table, the other with a 20 in. diameter rotary table.

The outside diameter of the drill bushing on the 12 in. size is 1 in. and on the 20 in. size it is 1¼ in. Drill bushings with this outside diameter can be used up to capacity of ⅜ in. on the 12 in. size and ⅝ in. in diameter on the 20 in. size. (Page 398, Sept. 24.)

NOW TURN TO PAGE 512, PLEASE

Automotive Oddities—By Pete Keenan


THE "TEAR DROP" BODY WAS THOUGHT OF 40 YEARS AGO
Sent in by Ralph Thrapdale.
PIECE OF LOOSE PAPER LEFT ON WING OF BILL MORLEYS PLANE WAS STILL THERE AFTER 4 HOURS OF FLYING. WHY?
KNOX AND NOYES AUTOMOBILES
A SIGN IN MEXICO CITY.
THE HON. BRIAN LEWIS LOST A WHEEL WHILE TRAVELLING 100 MILES AN HOUR YET NO ONE WAS HURT.
Belfast, Ireland. 1932.
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The NEWS TRAILER

Write us if you know an oddity

Just as Baltimore school authorities were about to let bids for a building to house an automobile repair shop for its vocational instruction activities, the local federation of labor arose in wrath and protested against the plan, saying that competent repairmen couldn't be produced in this manner, anyhow.

Gas masks for Javanese train crew and passengers may be in order if experiments to use scrap rubber for locomotive fuel are successful.

The Netherlands government rail and tramline systems have found that the heat value is higher than wood, although somewhat lower than the coal, which is too expensive for some of the divisions.

Gen. Augustin P. Justo, president of the Argentine, has submitted to the chamber of deputies a law to put truck and bus operations under the country's interstate carrier regulations, to curb their competition with railroads, one-fifth of which are government-owned, the remaining mileage belonging to British interests.

United Air Lines, with its fleet of 100 airplanes, uses more than 20,000,000 gal. of gasoline and more than 500,000 gal. of oil a year. With a bigger fleet and more miles flown than ever, the company will use about 80 per cent more fuel in 1932 than it did two years ago.

Six boys, instead of four as hitherto, will be awarded 4-year university scholarships next August at the close of the third annual model coach-building competition of the Fisher Body Craftsman's Guild.

This creates a total fund of $30,000 to be awarded in scholarships in the present year's competition, and increases to $85,000 the Guild awards for the year.

Each scholarship, including two for Canadian boys, is valued at $5,000, and entitles its holder to four years in the university of his own choice.

B. F. Goodrich Co. has announced a small rubber sound deadener to be worn in the ear, which will permit the user to hear an ordinary human voice while excluding the major part of the roar of an airplane or of factory machinery.

NEWS

Car Makers Draw Exhibit Spaces

1933 Show Opens Jan. 7 at Grand Central Palace

NEW YORK, Oct. 11—Participation of 38 makes of passenger cars, trucks and taxicabs in the 1933 National Automobile Shows at New York and Chicago was assured on Oct. 6 at the industry's official show drawing at the National Automobile Chamber of Commerce headquarters.

Demands of manufacturers for supplementary space to feature their individual lines separately were so great that all the available space on the first floor and mezzanine of the Palace was taken and part of the third floor set aside to take care of the overflow. The applications of shop equipment and automotive accessory exhibitors already exceed last year's requests.

The New York Show will be in Grand Central Palace Jan. 7 to 14, and the Chicago Show will be held in the Coliseum Jan. 28 to Feb. 4.

Among the new makes of cars to be represented for the first time at the National exhibitions are: Continental, Continental - DeVaux, Stutz (commercial unit).

In their preparations for the 1933 shows, manufacturers of the industry are concentrating on combining the display of their new cars with educational novelties, showing production or operation methods. This has been made possible, according to Alfred Reeves, the show manager, by the liberalization of rules governing the exhibits.

The main floor, mezzanine and part of the third floor of Grand Central Palace have been reserved exclusively for passenger-car exhibits, while the displays of commercial vehicles, accessories and shop equipment will occupy the third and fourth floors of the building.

At Chicago the vehicle exhibition will be on the main floor of the Coliseum, and the accessory and shop equipment exhibits will be on the gallery.

Charles D. Hastings, chairman, Hupp Motor Car Corp., is chairman of the Chamber's Show committee. Other members are: A. R. Erskine, president, Studebaker Corp., and Alfred H. Swayne, vice-president, General Motors Corp.

The makes of cars, whose appearance at the shows is assured, are:

Auburn, Austin, Buick, Cadillac, Chevrolet, Chrysler, Continental, Continental-DeVaux, DeSoto, Dodge Brothers, Essex, Franklin, Graham-Paige, Hudson, Hupmobile, LaSalle, Lincoln, Marmon, Nash, Oldsmobile, Packard, Pierce-Arrow, Plymouth, Pontiac, Reo, Rockne, Studebaker, Stutz, Willys-Overland, Willys-Knight.

Motor Trucks—Austin, Chevrolet, Corbitt, Federal, Graham Brothers (Dodge), Reo, Stewart, Stutz and Willys-Overland.

AC Employees Are Busy Again

2000 Return to Work on 1933 Car Accessories

FLINT, Oct. 10—Present employees of AC Spark Plug Co., division of General Motors Corp., numbering some 2000 are being returned to their jobs due to the company's increased production activities on 1933 models, according to Harlow H. Curtice, president and general manager.

While the number of working hours per week is lower than the standard of a 45-hour week it will be gradually stepped up as the fall production season advances.

Alabama Limits Truck Operations

BIRMINGHAM, Oct. 12—Governor Miller of Alabama has signed a bill fixing the maximum weight, height, width, length and speed of trucks, which will become operative in June, 1933.

The maximum weight with certain exceptions is 20,000 lb.; height 12 ft.; width 96 in.; length 30 ft. without trailer, and 40 ft. with trailer and speed 20 m.p.h. within a city and 30 m.p.h. outside of a city.

Exceptions include log trucks, dairy trucks, and farmers hauling their own products.

Trucking interests put up a strong fight and succeeded in getting the bill amended so as to provide less stringent regulations.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, Oct. 13—The high optimism of a while back has been moderated somewhat by recent declines in commodity and stock markets and the absence of any spontaneous upturn in general industry, but the undertone of confidence appears to have been maintained.

The seasonal gain in wholesale and retail lines continues, and retail sales are at about last year's levels.

Trade in expensive goods is dull, and activity is mostly confined to low-priced goods.

FREIGHT AT NEW HIGH

Railway freight loadings during the week ended Sept. 24 totaled 595,746 cars, the highest for any week so far this year. The total for the week under discussion was 8444 cars above that during the preceding week, but 142,290 cars below that a year ago and 354,917 cars below that two years ago.

ELECTRICITY DOWN

Production of electricity by the electric light and power industry of the United States during the week ended Oct. 1 was 8.9 per cent below that a year ago. However, the total for that week showed a continuation of the seasonal upturn.

FARM PRICES LEVEL

The index of farm prices of agricultural products on September 15 stood at 59 per cent of the pre-war average and showed no change from that a month earlier. The index a year ago stood at 72 per cent.

LUMBER ORDERS OFF

Lumber orders placed at the mills during the week ended Oct. 1 were below those in any of the four weeks preceding. The volume of new orders, however, was 44 per cent above production.

CRUDE OIL STEADY

Average daily crude oil production for the week ended Oct. 1 amounted to 2,172,000 bbl., as against 2,178,550 bbl. for the preceding week and 2,147,450 bbl. for a year ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices during the week ended Oct. 8 stood at 61.8, as against 62.2 the week before and 62.4 two weeks before.

BANK DEBITS DOWN

Bank debits to individual accounts outside of New York City during the week ended Oct. 5 were 31 per cent below those a year ago.

FEDERAL RESERVE

The consolidated statement of the Federal Reserve banks for the week ended Oct. 5 showed decreases of $7,000,000 in holdings of discounted bills, of $1,000,000 in holdings of bills bought in the open market, and of $3,000,000 in holdings of Government securities.

The reserve ratio on Oct. 5 was 61.1 per cent, as against 60.8 per cent a week earlier and 60.4 per cent two weeks earlier.

Waco Sells to Brazil

TROY, OHIO, Oct. 10—The Waco Aircraft Co. has announced a contract for 20 airplanes for the Brazilian government.

The planes will be equipped with machine guns, bombing racks, and radios. The Brazilian government will pay approximately $500,000 for the ships.

Nash Pays 25c. Dividend

33 Million Cash and Securities on Hand, Report

KENOSHA, WIS., Oct. 12—Nash Motor Co. has declared a dividend of 25 cents per share, payable Nov. 1 to stockholders of record of Oct. 20.

The balance sheet at the end of the third quarter of the fiscal year, comprising the months of June, July, and August, was presented showing $32,935,082.52 cash and government securities in the company's treasury.

The third quarter earnings, after deducting all expenses of manufacturing, selling, and administration, and providing for depreciation and both state and Federal taxes, amounted to $183,980.56.

The balance sheet presented, disclosing the figures at the end of the third quarter, brought out the fact that the inventories of the company, including raw material, work in process, and finished product, amounted to less than $500,000.

Hupp Directors Are Elected

NEW YORK, Oct. 12—At the annual meeting of stockholders of the Hupp Motor Car Corp., held in Richmond Va., Sept. 14, Charles D. Hastings, John W. Platten and DuBois Young were elected to the board of directors for the term ending Sept., 1935.

At an adjourned special meeting of the directors for organization, the present officers were reelected.

At a meeting of the board held Aug. 17, the following were elected directors to fill vacancies: A. J. Brosseau, Ellery W. Mann and Frank E. Smith.

Three Firms Merge To Make Car Parts

MILWAUKEE, Oct. 10—The Milwaukee Tool & Forge Co., South Milwaukee, Wis.; the Pressed Products Co., Napoleon, Ohio, and the Saturn Electric Water Heater Co., Bryan, Ohio, have merged and are consolidating operations in a Defiance, Ohio, plant.

Harold L. Schlesser, president of Pressed Products, will be general manager. J. A. Otis, vice-president of the Alemite Corp., and Stewart Warner of the Stewart-Warner Co., Chicago, have been elected directors.

Products will be a line of automobile stampings, steel tubing, screw machine products, mechanics' tools and transmission line hardware.

Toledo New Car Sales Up 54%

TOLEDO, Oct. 10—New car sales in Lucas County (Toledo) showed a gain of 53.7 per cent for September as compared with the same month last year, according to Thomas J. Cooper, secretary of the Toledo Automotive Trades Association.

There were 266 new cars registered in September as compared with 173 in the same month last year.

August had a gain of 15 cars over the previous month and September was 93 cars better than August, which was the first month in three years to show a gain in retail car sales here.

Milwaukee Die Casting Busy

MILWAUKEE, Oct. 10—An increase of 50 per cent over the preceding month was shown by the September business of the Milwaukee Die Casting Co., according to Henry F. Schroeder, president.

The entire force is working three days a week, with some departments on a five-day schedule.

Expected increases in the activities of automobile manufacturers are looked for to further stimulate production soon.

Automobile Financing is Off, Reports From 330 Firms Show

WASHINGTON, Oct. 10—Monthly statistics on automobile financing, based on data reported to the Bureau of the Census by 330 automobile financing organizations, are presented in the table below. These figures include complete revisions to date.

Year and Month	Wholesale Financing Volume in Dollars	RETAIL FINANCING											
		TOTAL			NEW CARS			USED CARS			UNCLASSIFIED		
		Number of Cars	Volume and Average		Number of Cars	Volume and Average		Number of Cars	Volume and Average		Number of Cars	Volume and Average	
			Total Amount	Per Car		Total Amount	Per Car		Total Amount	Per Car		Total Amount	Per Car
1930													
August	$45,314,862	247,105	$102,711,011	$416	111,018	$63,973,477	$567	129,525	$37,106,115	$286	6,562	$2,631,419	$401
Total (8 Mos.)	$514,607,261	2,195,213	$903,861,111	$412	1,000,829	$564,855,407	$564	1,124,302	$311,388,066	$277	70,082	$27,617,638	$394
Total (Year)	$660,978,901	2,933,973	$1,201,341,267	$409	1,287,796	$730,417,562	$567	1,558,932	$435,989,399	$280	87,245	$34,934,306	$400
1931													
January	$40,164,672	160,490	$61,691,837	$384	58,499	$32,945,588	$563	97,834	$27,236,324	$278	4,157	$1,509,925	$363
February	49,812,959	172,958	66,130,134	382	67,599	36,854,428	545	100,696	27,707,242	275	4,663	1,568,464	336
March	63,089,716	237,273	91,997,270	388	102,665	55,022,086	536	128,311	34,688,428	270	6,297	2,286,756	363
April	71,194,343	290,076	112,982,254	389	133,347	70,544,761	529	149,112	39,546,288	265	7,617	2,891,205	380
May	72,623,199	277,950	109,372,143	393	126,729	68,564,134	541	142,796	37,781,543	265	8,425	3,026,466	359
June	58,171,936	265,389	104,642,284	394	115,106	63,554,955	552	141,935	37,988,162	268	8,348	3,099,167	371
July	48,853,330	236,878	95,910,307	405	100,832	59,300,107	588	128,707	34,126,071	265	7,339	2,484,129	338
August	43,942,549	204,878	79,598,201	389	83,602	46,865,947	561	115,020	30,486,513	265	6,256	2,245,741	359
Total (8 Mos.)	$447,852,704	1,845,892	$722,324,430	$391	788,379	$433,652,006	$550	1,004,411	$269,560,571	$268	53,102	$19,111,853	$360
September	35,840,571	176,663	68,284,838	387	67,609	38,609,797	571	103,234	27,580,567	267	5,820	2,094,474	360
October	25,770,269	159,980	60,691,614	379	58,055	33,195,759	572	97,437	25,882,006	266	4,488	1,613,849	360
November	15,719,974	131,047	48,568,648	371	44,701	25,394,801	568	82,816	21,891,123	264	3,530	1,282,724	363
December	29,257,137	134,663	50,432,428	375	48,131	27,305,927	567	82,757	21,859,828	264	3,775	1,266,673	336
Total (Year)	$554,440,655	2,448,245	$950,301,958	$388	1,006,875	$558,158,290	$554	1,370,655	$366,774,095	$268	70,715	$25,369,573	$359
1932													
January	$34,841,766	122,344	$44,628,529	$365	41,375	$23,475,671	$567	77,321	$19,974,286	$258	3,648	$1,178,572	$323
February	33,276,393	123,574	44,829,138	363	40,780	23,623,496	579	78,802	19,941,665	253	3,992	1,263,977	317
March	34,121,364	140,779	51,148,285	363	46,234	26,887,515	582	90,121	22,779,892	253	4,424	1,480,878	335
April	33,903,704	155,691	56,415,652	362	57,661	31,835,792	552	93,398	23,066,269	247	4,632	1,513,591	327
May	38,608,439	164,721	58,435,573	355	63,885	33,590,555	526	96,010	23,257,953	242	4,826	1,587,065	329
June	43,682,471	177,961	63,169,095	355	74,205	38,329,334	517	99,513	23,394,676	235	4,243	1,445,085	341
July*	26,016,028	132,467	44,716,907	338	45,816	24,149,326	527	82,687	19,225,478	233	3,964	1,342,103	339
August**	22,113,678	(a)131,041	45,058,076	344	46,395	24,633,275	531	80,641	18,909,176	234	4,005	1,515,625	378
Total (8 Mos.)	$266,563,843	1,148,578	$408,401,255	$356	416,351	$226,524,964	$544	698,493	$170,549,395	$244	33,734	$11,326,896	$336

* Revised

** Preliminary

(a) Of this number 35.40 per cent were new cars, 61.54 per cent used cars, and 3.06 per cent unclassified.

Reject Bid for Durant Factory

R. E. Olds Offers $105,000 for Plant Valued at $3,000,000

LANSING, Oct. 10—After Ransom E. Olds, Lansing capitalist, submitted a bid of $105,000 for the $3,000,000 plant of the Durant Motor Co. at the second public auction sale here Oct. 6, a committee representing the creditors recommended to the Central Trust Co., receivers, that the offer be rejected.

The sale was adjourned until 10 a.m., Nov. 17. The first public auction was held Sept. 9, when no bids were submitted.

About 300 persons, mostly former Durant employees, were at the plant Thursday morning. Soon after the sale opened at 10 o'clock, Mr. Olds, who two days ago placed a certified check for $100,000 with the receivers, bid $105,000. No other bids were filed and the sale was continued until 11 o'clock, when the action of the committee was announced and the sale adjourned.

Mr. Olds already owns the huge Ryan-Bohn foundry building located just west of the Durant property. He purchased this structure nearly two years ago and planned manufacturing operations there, but it has so far remained idle.

Observers pointed out Thursday that it could be easily converted into a foundry unit for use with the Durant buildings and that the purchase of the Durant property by the Lansing capitalist would probably mean the eventual operation of the entire layout which would again transform the west side into a center of industrial activity.

It was not definitely known Thursday whether Mr. Olds was bidding for the Durant property for himself or for outside interests. It was rumored that he is representing a large Chicago manufacturing concern, but he would neither confirm nor deny the report.

The Durant plant was placed in receivership early this year by Judge Edward J. Moinet in Federal court at Detroit. After several weeks in which over 200 automobiles, machinery, and other equipment on hand were sold, the court ordered the property advertised for sale.

The Durant factory has been practically idle for two years. It was constructed in 1921 by William C. Durant, one of the most colorful figures in the automotive industry. The Star car was manufactured there.

In 1928 Durant planned greater activity and built an addition costing $1,200,000, making the plant one of the finest in the country.

A new set of officers, including many of the best known men in the industry, was selected and a new program was launched. The present economic depression arrived, however, and Durant faltered and finally dropped completely out of the industrial world.

The property consists of 21 buildings. The real estate includes 47 acres. The total ground area covered by the buildings is 605,969 sq. ft., and the buildings have a total floor space of 918,298 sq. ft.

The entire plant is considered ideal for practically any type of manufacturing. According to an appraisal made in May of this year by the H. G. Christman Lansing Co., builders, the present reproduction cost would be $2,244,260.

September Rubber Shipments Up

NEW YORK, Oct. 10—Gross exports of crude rubber from British Malaya during September, amounted to 41,973 tons, the Rubber Exchange of New York, Inc., was informed, compared with 39,337 tons in August, and 44,336 tons in September, 1931.

Shipments by Ceylon, to consuming countries were smaller, totaling 4361 tons, against 5585 tons in the month of August, and with 4195 tons in September last year.

Ceylon's exports to the United States during September were 3003 tons, against 3604 tons in August.

Daily is Manager of Wheeling Steel Plant

J. Edward Daily, formerly a vice-president of the Timken Roller Bearing Co., Canton, Ohio, has been named general manager of the Steubenville works of the Wheeling Steel Corp. He resigned from Timken last spring.

International Harvester Engineers at W-O Plant

TOLEDO, Oct. 10—Several technical men and executives of the International Harvester Co. of America have been at the Willys-Overland plant here helping to supervise the arrangements for the production of the new six-cylinder half-ton truck to be made for the Harvester Co.

A section of the big plant here is being tooled up for the production of this new unit.

Definite date for the production to start in a big way has not yet been announced, but it is thought that the new trucks will be coming off the line regularly here within a few weeks.

Lincoln Shows Gain

DETROIT, Oct. 10—A sharp increase in retail sales of Lincoln motor cars in September was reported today by the Lincoln Motor Company.

Total retail sales were 25.4 per cent greater than retail sales in the same month last year, and also showed an increase over retail sales in August this year.

Present indications, it was said, point to maintenance of a relatively high volume of retail sales during the current month.

Goodyear of Canada Earnings Reported

President Carlisle Predicts Business Upturn in Statement to Stockholders

NEW TORONTO, ONT., Oct. 10—Earnings of the Goodyear Tire & Rubber Co. of Canada, Ltd., in the third quarter of the company's fiscal year were sufficient to cover both the preferred and common dividends, it is stated in a letter from C. H. Carlisle, president and general manager.

He said that "Canada, in 1933, should show an improved business condition as compared with 1932.

"We are completing the harvesting of a very excellent crop, both as to volume and quality.

"Our gold production has materially increased. We anticipate increased business activity as a result of the recent Empire Conference.

"One of our greatest problems has been and is the operating and financing of our railroads. Our Government has already taken steps whereby this problem will be solved, resulting in a great saving to the country.

"General conditions throughout the world show some improvement. It will require considerable time to bring about stability of governments, stabilization of exchange and more equitable regulations governing trade. Export business very largely depends upon these conditions.

"On the revival of general business, the tire industries should show a marked improvement, as many people are taking the last mile out of their tires, reducing the number of spare tires carried, and they are purchasing low priced tires, which necessarily give low mileage."

Gas Levies Vie With Liquor Tax in Quebec

QUEBEC, Oct. 12—From a humble beginning, fees derived from automobile licenses in the Province of Quebec have risen to a point where they are now counted as one of the main sources of revenue and in the last fiscal year were only outstripped by Liquor Commission figures.

A total of $45,500,939.72 has been paid since licensing was first started in 1905. The first year that the law was in force only $1,710 was collected.

As the number of "horseless carriages" increased in the province, so did the revenue from their licenses, and in 1907-08 the receipts jumped past the $5,000 mark.

Double figures were recorded in 1909-10, when the automobile law, as it was then known, yielded $11,048.

In 1912-13, the recipts reached the $40,000 mark, but the following year, or immediately preceding the World War, they jumped to $122,575.85, an increase of 200 per cent. In 1919-20 receipts touched $1,180,725.77.

More Used Cars and Fewer New Vehicles Bought to Escape Federal Tax

September Motor Output Estimated at 79,166 Units; Car Makers Study Shows Industry's Employment Hit by New Motor Taxes

NEW YORK, Oct. 11—More people are buying used cars instead of new ones since the Federal excise, or "nuisance," taxes on motor vehicles went into effect three months ago, members of the National Automobile Chamber of Commerce learned here Oct. 6.

"Our records on retail car sales show a marked drop in the ratio of new to used car purchases for July and August, the first two months that the discriminatory Federal motor taxes were in effect," declared Alvan Macauley, president of the organization. "In July, automotive retailers sold 291 used cars for every 100 new ones. In August, the ratio was 244 used cars for every 100 new car sales.

"The percentage of new to used car sales for the month before the Federal taxes became effective was 100 to 188, which was about the same ratio that maintained during July and August of 1931."

Thousands of workmen would have had additional employment in July and August if motor taxes had not diverted automobile purchasers to used car markets, Chamber officials asserted.

"The effect of these taxes is most regrettable, coming at a time when the maintenance and expansion of employment is of such paramount national concern," Mr. Macauley stated.

"It will not be contested that the motor industry has attempted everything within its power to aid in the recovery of business during the last three years. That we should now be penalized for the work by having our industry saddled with a disproportionate share of the burden of taxation cannot be defended.

"Under the new Federal revenue program it is provided that 258 million dollars or 24 per cent of the total additional funds to be raised will be exacted in taxes upon automotive products or commodities for which car owners are the principal consumers, this despite the fact that state, local and municipal governments are already plucking highway users to the amount of more than a billion dollars annually."

Another report submitted at the Chamber meeting disclosed that the industry's September production was estimated at 79,166 units. This was 16 per cent under the output for the preceding month and 45 per cent under that of September a year ago. Production for the year to date was estimated at 1,203,262 units, Mr. Reeves announced.

Executives Inspect New AC Spark Plug Cleaner

Here's AC's twentieth product. Louis Berg, works manager; Harlow H. Curtice, president, and Hector Rabezzana, chief engineer of the spark plug division, inspect one of the first AC spark-plug-cleaning machines to come off the production line

Canadian Production Decreases 41%

1931 Totals, Just Announced, Show $60,000,000 Value Produced in Dominion

OTTAWA, ONT., Oct. 10—A reduction of 41 per cent in Canadian automobile production was noted in 1931, as compared with the previous year, according to a government report released today.

Last year's production value was $59,674,345 as against $101,677,487 for 1930. The 1931 value was the lowest since 1917.

The sales value of the 82,559 cars produced in Canada last year amounted to $52,964,936, a drop of 42 per cent in value. The decline in cars was 46 per cent, the 1930 total being 153,372.

Eighteen companies manufactured or assembled motor cars in this country in 1931, distributed with 17 factories in Ontario, four in Quebec, three in British Columbia, and one each in Manitoba and Saskatchewan.

These 18 companies employed a capital of $59,638,057, and gave employment to a monthly average of 9545 people. The 1757 salaried employees were paid $4,288,009 and the 7788 wage earners, $8,825,183.

Only three concerns in Canada produced their own engines, the total being 55,966 as against 114,880.

Cadillac Sales Show Spurt in September

DETROIT, Oct. 10—J. C. Chick, general sales manager, Cadillac Motor Car Co., has announced that Cadillac-LaSalle sales increased progressively through each 10-day period of September and finished the month with a total equal to the August volume. August sales were 40 per cent greater than the preceding month of July.

One noticeable feature has been the increase in sales of high-priced lines, with percentage of business of Fleetwood models as high as it has been in any previous year.

Ford Again Leads In Vehicle Sales

DETROIT, Oct. 10—Ford Motor Co. now leads in sales of commercial cars and trucks throughout the United States for 1932 on the basis of complete reports just received for the eight months period ending Aug. 31.

This was accomplished despite the fact that deliveries of the new Ford commercial units did not begin in volume until June.

The official reports of registrations throughout the country show total Ford sales of 45,857, or 35.2 per cent of the total of 130,376 units of all makes registered in the eight months period.

Data Backs Steel Hopes

Developments at Mills Raise Hopes for Speedy Upturn

NEW YORK, Oct. 13—Statistical developments of the week gave a full measure of support to the more hopeful sentiment in the steel market. The leading interest's unfilled tonnage statement, made public Monday afternoon, showed a gain of 15,495 tons during September at the end of which month the backlog stood at 1,985,090 tons.

Analysis shows that shipments increased approximately 13 per cent over those in August and bookings 20 per cent.

With so much of the business that comes out being for immediate shipment, this gain in bookings is decidedly encouraging. The American Iron and Steel Institute's report of steel ingot production revealed an increase of 21.6 per cent in steel output, the average daily production in September having been 37,502 tons as against 30,830 tons in August.

The Institute's figures which are based on performance reports showed that the week-to-week estimates had been much too low.

These developments have raised confidence in the steel market to the point where further moderate increases in bookings during this month and November are looked for, but with December rather a doubtful month in point of fresh business. September is thought to have scored the biggest upturn in the movement.

With any sort of quickening in the rate at which automotive consumers are buying steel a considerably better showing by the steel industry during the final quarter of 1932 is conceivable, but rollers and alloy steel makers are reconciled to a continuance of business along present lines over the remainder of the year.

Pig Iron—Fair-sized shipments to automotive foundries with very little fresh contracting are reported by nearly all the markets. Prices hold steady except at seaboard points where Machurian, Dutch and East Indian iron are offered at prices below those of domestic furnaces.

Aluminum—Although aluminum consumption in the automotive industries continues relatively light, Detroit October takings are reported to be slightly ahead of those of the preceding month. Prices are unchanged and steady.

Copper—Little activity is noted in the market for account of domestic consumers. The price for electrolytic continues unchanged at 6¼ cents delivered Connecticut Valley.

Tin—The market has receded further, chiefly under the influence of stock market developments, Straits tin being quoted at the beginning of the week at 23.85 cents.

Lead—Almost daily price changes were accompanied by a certain amount of buying by consumers for current requirements. November bookings are rather slow in coming through. After opening at 3.15 cents, New York, the leading interest's contract price was lowered early in the week to 3 cents. A large Western market factor withdrew from the market and the usual $3 per ton spread between New York and St. Louis quotations was nominally lowered to $2.

Tool Builders Elect; A. W. Robertson Speaks

SWAMPSCOTT, MASS., Oct. 11 *(Special)*—H. S. Beal, manager, Jones & Lamson Co., was elected president of the National Machine Tool Builders Association at their annual meeting here.

E. A. Muller, King Machine Tool Co., was named first vice-president; Richard A. Heald, treasurer, Heald Machine Co., was elected second vice-president and F. H. Chapin, president, National Acme Co., was chosen treasurer of the association.

SWAMPSCOTT, MASS., Oct. 12—With A. W. Robertson, chairman of the National Committee on Industrial Rehabilitation, as the principal speaker at the dinner on Tuesday night, the National Machine Tool Builders' Association, assembled here for its Thirty-first Annual Convention, centered its interest in the furthering of this great movement for economic recovery.

Emphasis was placed by Mr. Robertson and other speakers during the convention on the facts that a high percentage of our production equipment is obsolete and that there is no overequipment for efficient production according to present standards.

At the general sessions, with President R. M. Gaylord of the Ingersoll Milling Machine Co., in the chair, papers were presented by:

H. S. Beal, general manager, Jones & Lamson Machine Co.; Jas. E. Gleason, president, Gleason Works; Prof. E. H. Scheel, Mass. Institute of Technology; E. P. Blanchard, sales manager, the Bullard Co., and Col. L. S. Horner, vice-president, the Bullard Co. The subjects discussed included the "Proper Profit Policy for Machine Tool Builders in Periods of Depression," "Trade With Russia," "Tomorrow's Problems of the Machine Tool Industry," "Time Sales and Trade Acceptances."

Interesting talks on conditions in Europe were made by F. A. Geier, president, Cincinnati Milling Machine Co., and F. H. Chapin, president, National Acme Co. The Hon. Marcus A. Coolidge, U. S. Senator from Massachusetts discussed the recent Congressional activities and some of the political aspects of economic recovery.

Three new directors of the association were elected: J. G. Benedict, treasurer and general manager of Landis Machine Co.; H. H. Pease, president, New Britain-Gridley Machine Co., and C. J. Stillwell, vice-president, The Warner & Swasey Co.

Reynolds Spring Co. Buys Dura Assets

Inventory, Good will, Dies, Tools, Etc., in Deal

JACKSON, MICH., Oct. 12—Reynolds Spring Co. has acquired from the Dura Co. of Toledo all the inventory, goodwill, dies, tools, and fixtures necessary for the manufacture of the product nationally known as "Duraware," Charles G. Munn, president of the Reynolds, announced today.

Mr. Munn estimated that this acquisition will add $500,000 to Reynolds' yearly sales. It is anticipated that Reynolds will break even in the third quarter and show a profit in the last quarter this year, according to Mr. Munn's recent estimate. "Duraware" is adaptable for making a wide range of gift and household articles, and will be used separately or combined with the new Reynolds product, "Bonnyware," which is being made into a large number of similar articles at the present time.

Reynolds Spring Co. has heretofore manufactured automobile, furniture and other cushion springs, as well as various other mechanical articles such as "Bakelite" products, Ford distributors, etc.

Large-scale production of its new "Bonnyware" line, begun only in September, will result in nearly 1200 new employees being put to work by Oct. 15 in the company's "Bakelite" plant in Jackson, which is operating 24 hours a day seven days a week.

On Oct. 1, *Automotive Industries* announced the sale of the Dura Co., makers of automotive hardware, to the Richardson Securities Co., local affiliate of the Toledo Trust Co., for $355,000, was confirmed today in Federal Court.

Canadian August Above 1931 Figure

WASHINGTON, Oct. 10—Canadian August exports of automotive products were valued at $752,420, as compared with a value of $1,088,766 for July, a drop of 30.8 per cent, but were still 96 per cent above those for the same month last year, however, when shipments were only $377,980, according to the Commerce Department's automotive division.

Shipments of auto parts declined, however, from $436,189 in July to $125,293 in August.

Unit passenger car exports increased from 1308 in July to 1368 in August; trucks declined from 185 in July to 155 in August. Of the passenger car exports, 934 were of the low-priced class, and 428 were in the medium-priced class. Truck shipments included 177 low capacity vehicles.

Total auto production was 45 per cent below that of July, 1932.

Canada's Long-Awaited Export Concessions Now in Effect

Prime Minister Issues Orders to Hasten Ottawa Conference Program Through Law-Making Routine of Dominion Parliament

TORONTO, Oct. 13—Canada's conference-negotiated trade concessions to the United Kingdom, South Africa, Irish Free State and Southern Rhodesia became operative today, according to Prime Minister R. B. Bennett, to the Canadian Parliament. Through the introduction of a resolution ratifying agreement terms, the treaty with Great Britain was given precedence in the legislative routine.

The exact tariff conditions laid down with respect to automobile imports from the United Kingdom are not yet known and the reciprocal preferences which the United Kingdom is granting to Canada cannot be divulged or acted upon for some time because the Imperial Parliament at London does not meet until Oct. 18 to give effect to the conference undertakings.

The United Kingdom Government will ask the Imperial Parliament late this month to approve new customs duties against products from foreign countries and to admit similar items from Canada into the United Kingdom free of duty, it is intimated.

The Canadian tariff changes number more than 200 and affect automobile chasses, equipment, accessories, engines, tractors, electrical equipment, coal, machinery, garage equipment, wire products, flat glass, leather goods, processed and fabricated steels, motorcycles and other lines, according to reliable information.

What the increased preferences to British products will be has not been stated. It is expected that the United Kingdom will take a more lenient tariff view toward Canadian automobiles and trucks which can show the prescribed Canadian content of materials and labor of 50 per cent.

Likewise, South Africa and Southern Rhodesia have promised tariff concessions to Canadian-made automobiles and trucks.

According to the Canadian tariff schedules effective to October 13, British passenger cars and trucks imported into Canada paid either 12½ or 15 per cent duty as against an intermediate and general tariff ranging from 17½ to 40 per cent. Exports from the United States came under the general list as follows: Cars and chasses valued to $1,200, 20 per cent; value $1,200 to $2,100, 30 per cent; and above, 40 per cent. British cars valued to $1,200 paid a duty of 12½ per cent, and above, 15 per cent.

One effect of a free entry privilege to Great Britain, as expected, will be to facilitate exchange agreements such as the one recently worked out between the English and Canadian Ford Companies whereby the English plant markets the four-cylinder line in British countries and the Canadian company the eight-cylinder line.

Free trade to Britain will also prove a stimulus to British automobile manufacturers to exploit the Canadian field to a much greater extent than heretofore and probably lead to the establishment of branch plants or warehouses in the Dominion or to a linking up in manufacturing contracts with factories already operating in Canada.

South Carolina Registrations Off

COLUMBIA, S. C., Oct. 12—During the first nine months of this year 151,304 automobiles were registered with the South Carolina highway department.

This compares with a total registration of 175,635 for the corresponding period of 1931.

Receipts for the period mentioned totaled $2,429,263.75, as compared with $2,746,677.85 for the first nine months of 1931.

Libbey-Owens Glass Sees Upturn Near

TOLEDO, Oct. 10—The Libbey-Owens-Ford Glass Co. has been operating its laminated plant here at 60 per cent of capacity and plate glass plant at 25 per cent of capacity with about 1100 workers on the payrolls, it was announced today.

Officials expect a gain in demand from automotive customers in November according to schedules on hand.

New car building is looked to for a gain next month, said D. H. Goodwillie, executive vice-president of the company.

Burt Elected to ASA Board

Clayton R. Burt, president and general manager of the Pratt and Whitney Co., Hartford, Conn., has been elected as a member of the board of directors of the American Standards Association, representing the National Machine Tool Builders' Association.

After the war, he became president of the New Process Gear Co., Syracuse, connected with the Willys Corp., and later he was president of the Austin Machinery Co., Toledo, Ohio.

1932 Commerce Yearbook Ready for Distribution

600-Page Volume Records U. S. Business for Year

WASHINGTON, Oct. 10—The first volume of the Commerce Yearbook, 1932, covering the United States is now ready for distribution. This compilation, authorized by law and issued annually by the Department of Commerce, is recognized generally as the official and final record of American business in the calendar year preceding its publication.

The primary purpose of the Yearbook is to present in readily usable form essential data on all phases and all branches of trade and industry. In it are discussed the broad subjects of domestic and foreign trade, manufacturing, transportation, employment, finance and power, together with individual surveys of each major industry. In each instance, pertinent tables, charts and graphs accompany the discussion.

The present volume contains 600 pages, is substantially bound and adequately indexed. Copies are obtainable from branch offices of this Bureau or from the Superintendent of Documents, Washington, D. C. The price is $1.25. Because of reduced appropriations for printing, etc., there will be no issue of this volume in 1933.

Tenny Returns to Marmon Post

George C. Tenny has returned as general sales director of the Marmon Motor Car Co., G. M. Williams, president, announced. Assisting Mr. Tenny in the supervision of sales activity will be S. V. Harding, who continues in the post of sales manager.

The new Marmon general sales director has a background of 14 years of experience in the fine car field, having been connected with Locomobile and Pierce-Arrow in addition to a previous period when he was with Marmon as general sales director and assistant to the president.

Mr. Tenny returns to Marmon at a time when the company is completing a new and aggressive program for the future. This program will be formally announced this month.

Wilcox-Rich Offers Valve-Seat Ring

DETROIT, Oct. 12—A new product—a valve seat ring—is now being regularly manufactured by Wilcox-Rich Corp., a Division of Eaton Manufacturing Co. These rings, developed by Wilcox-Rich throughout several years of experimentation, were originally designed to meet the more exacting needs of aircraft and commercial-vehicle engines, but they are now being adopted as standard factory equipment by a number of passenger car manufacturers.

G. M. September Sales Are 34,694

Corporation Shows Slight Decrease in Deliveries to Users

NEW YORK, Oct. 10—September sales of General Motors cars to consumers in the United States totaled 34,694 as against 37,230 in August and 51,740 in September a year ago.

September sales of General Motors cars to dealers in the United States totaled 23,545 as against 24,151 in August and 47,895 in September a year ago.

September sales of General Motors cars to dealers in the United States and Canada, together with shipments overseas, totaled 30,117 as against 30,419 in August and 58,122 in September a year ago.

Below is a tabulation of General Motors monthly sales for 1929, 1930, 1931, and 1932 to date. The figures are segregated to show:

(1) Sales of General Motors cars to consumers in the United States;

(2) Sales of General Motors cars to dealers in the United States and

(3) Total sales of General Motors cars to dealers in the United States and Canada plus overseas shipments.

SALES TO CONSUMERS IN UNITED STATES

	1932	1931	1930	1929
Jan.	47,942	61,566	74,167	73,989
Feb.	46,855	68,976	88,742	110,148
Mar.	48,717	101,339	123,781	166,942
Apr.	81,573	135,663	142,004	173,201
May	63,500	122,717	131,817	169,034
June	56,987	103,303	97,318	154,437
July	32,849	85,054	80,147	147,079
Aug.	37,230	69,876	86,426	151,722
Sept.	34,694	51,740	75,805	124,723
Oct.	...	49,042	57,757	114,408
Nov.	...	34,673	41,757	68,893
Dec.	...	53,588	57,989	44,216
Total		937,537	1,057,710	1,498,792

SALES TO DEALERS IN UNITED STATES

	1932	1931	1930	1929
Jan.	65,382	76,681	94,458	95,441
Feb.	52,539	80,373	110,904	141,222
Mar.	48,383	98,943	118,081	176,510
Apr.	69,029	132,629	132,365	176,634
May	60,270	136,778	136,169	175,873
June	46,148	100,270	87,595	163,704
July	31,096	78,723	70,716	157,111
Aug.	24,151	62,667	76,140	147,351
Sept.	23,545	47,895	69,901	127,220
Oct.	...	21,305	22,924	98,559
Nov.	...	23,716	48,155	39,745
Dec.	...	68,650	68,252	36,482
Total		928,630	1,035,660	1,535,852

TOTAL SALES TO DEALERS IN U. S. AND CANADA PLUS OVERSEAS SHIPMENTS

	1932	1931	1930	1929
Jan.	74,710	89,349	106,509	127,580
Feb.	62,850	96,003	126,196	175,148
Mar.	59,696	119,195	135,930	220,391
Apr.	78,359	154,252	150,661	227,718
May	66,739	153,730	147,433	220,277
June	52,561	111,668	97,440	200,754
July	36,872	87,449	79,976	189,428
Aug.	30,419	70,078	85,610	168,185
Sept.	30,117	58,122	78,792	146,483
Oct.	...	25,975	28,253	122,104
Nov.	...	29,359	57,257	60,977
Dec.	...	79,529	80,008	40,222
Total		1,074,709	1,174,115	1,899,267

Osborn is Promoted

Paul V. Osborn has been appointed manager of the Carrier Mfg. Corp., subsidiary of Carrier Corp., Newark, N. J.

He joined the Carrier organization about a year ago as manager of the plant at New Brunswick, N. J. In his new position, he will have charge of all manufacturing operations at the six Carrier plants in Bridgeport, Pa.; Allentown, Pa.; Newark, N. J., and at New Brunswick.

Mr. Osborn was formerly associate general manager in charge of plant operations and purchasing for the Continental Motors Corp., and assistant to the president of the Lakey Foundry & Machine Corp., Muskegon, Mich.

Olds Holds Own In September Sales

DETROIT, Oct. 10—September retail sales of Oldsmobiles were within one and a fraction per cent of those of September, 1931, while figures for the entire industry are approximately 50 per cent below sales of last year.

Retail sales of Oldsmobiles in September were 98.66 per cent of those of the same month last year.

Marlin-Rockwell Combines Subsidiary Activities

JAMESTOWN, N. Y., Oct. 13—In order to more effectively place at the disposal of its customers the combined sales, engineering and manufacturing facilities of its various subsidiaries, the Marlin-Rockwell Corp. has consolidated the sales activities formerly carried on independently by its subsidiary companies, the Gurney Ball Bearing Division, Standard Steel and Bearings, Inc., and the Strom Bearings Co.

The bearings manufactured by all of the above companies will be available to the trade through Marlin-Rockwell Corp.'s sales organization with offices here, Plainville, Conn., and Chicago.

Tennessee Collects $1,102,257 on Gas

NASHVILLE, Oct. 10—The Tennessee tax on gasoline yielded $1,102,257.46 during the month of September.

Dardelet Licenses Baldwin Locomotives

NEW YORK, Oct. 10—Baldwin Locomotive Works, Philadelphia, and subsidiary companies have been licensed by the Dardelet Threadlock Corp. to manufacture for their own use bolts, nuts and other parts threaded with the Dardelet self-locking thread.

MacKenzie is Elected

Alex MacKenzie, Toronto, has been elected vice-president and director of the Canadian National Carbon Co., Ltd.

Alabama Seeks 3½c More Gas Tax

Additional Levy Would Set New U. S. High For Gasoline Toll

MONTGOMERY, ALA., Oct. 10—State Highway Director L. G. Smith last week informed a joint session of the Alabama Senate and House that in order to maintain its roads and match Federal aid the State of Alabama needs $10,000,000, only 50 per cent of which is available.

As a means of raising the remainder of this amount, he suggested an additional 3½-cent tax on gasoline. The present state tax is 5 cents per gallon.

If the tax is approved, it will make an 8½-cent tax, the highest in the United States. Florida and Tennessee have a 7-cent tax, and five states have a 6-cent gasoline tax.

Pennsylvania Buys Vortox Air Cleaner

CLAREMONT, CALIF., Oct. 13 — Pennsylvania's Highway Department has purchased 426 Vortox air cleaners from the Vortox Mfg. Co. here. Of these, 227 units will be installed on trucks and road rollers, and 199 cleaners will be used on Ford trucks operated by the department.

Recently Dodge Brothers delivered to the department 100 trucks equipped with Vortox air cleaners. The company received a request for bids covering an additional 102 Vortox assemblies for installation on trucks.

German Airplane Registrations Gain

BERLIN (Special)—Airplane registrations in Germany have increased from 535 in 1928 to 1144 for 1931, the latest period for which figures are available, according to Assistant U. S. Trade Commissioner A. D. Cook, here.

During the years 1928 and 1929 there was an average yearly increase of registrations of about 200, while during 1930 and 1931 the average increase was about 100 annually, it was stated.

This drop was due in large part to decreased production, the increased number of damaged planes taken from the register, and increased foreign sales of planes registered in Germany.

Only planes registered in the German official lists may operate in that country, it was pointed out.

As of Jan. 1, 1932, planes registered in Germany were divided into classes as follows:

Air transport operators, 237; private firms and individuals, 191; German traffic pilot school, 163; air service operators, 159; experimental institutes, 149; flying clubs and associations, 129; airplane factories, 106; and the government, 10.

Jobbers Meet In Pittsburgh

Forty Wholesalers Join Manufacturers In N.S.P.A. Meet

DETROIT, Oct. 10—Executives of 40 automotive jobbing concerns and about an equal number of manufacturers' representatives participated in the Jobbers' Conference staged at the William Penn Hotel in Pittsburgh on Oct. 4 with the cooperation of the N.S.P.A.

The meeting was unusually constructive in tone, the jobber speakers avoiding the mistake often made at such affairs of resorting to destructive criticism of manufacturers' policies.

Jobber speakers on the program were—E. M. Sheehan, chairman, Motive Parts Co. of Penna., Pittsburgh; L. H. Thompson, Automotive Parts Co., Pittsburgh; J. M. Hepfer, The John M. Hepfer Co., Parkersburg, W. Va.; C. F. Hoffman, Hoffman Auto Parts, Butler, Pa.; R. C. Brown, Brown Motor Supply Co., Bedford, Pa.; Sam F. Rule, F. E. Rowe Sales Co., Akron, Ohio; Chas. H. Sanborn, Sanborn Motor Equipment, Ashtabula, Ohio; Henry Voight, Genuine Parts Co., Wheeling, W. Va.; W. A. Fleming, Fleming & Ashman, Inc., Buffalo, N. Y., and J. H. Wolff, Wolff's Stark Auto Parts Co., Canton, Ohio.

E. P. Chalfant, executive vice-president of the N.S.P.A., was on hand and acted as guest chairman of the meeting. A. R. Sandt, marketing research director of the N.S.P.A., opened the morning session with his talk on "Jobber Management Problems and Their Solution."

The day's business sessions were brought to a pleasant conclusion in the evening by a banquet and entertainment.

On the committee in charge of arrangements for the conference were E. M. Sheehan, C. A. Hoffman, and M. F. Wible.

Vincent G. Apple

Vincent G. Apple, one of the pioneers of the automobile industry who was active particularly in the electrical-equipment field, died in Dayton, Ohio, on Sept. 25.

During the early days of the industry he developed a generator for ignition current, called a spark generator, and he organized the Dayton Electric & Manufacturing Company for its manufacture.

When, later on, electric starters were adopted on passenger cars, he brought out a starting and lighting system, and for the manufacture of this equipment he organized the Apple Electric Co., also of Dayton.

This firm was later absorbed by the Splitdorf Electrical Company of Newark, N. J. Mr. Apple remained with the Splitdorf Company for about a year and he then established the Vincent G. Apple Laboratories of Dayton, for general experimental work and the development of inventions.

Apple was a prolific inventor and had several hundred United States patents issued to him. Having been born (in Mamisburg, Ohio) in 1875, he was in his 58th year at the time of his death.

DeSoto Shipments Show Steady Gains

DETROIT, Oct. 10—DeSoto Motor Corp. has reported shipments of 1336 cars during September, compared with 1053 for August and 1183 for September last year, representing increases of 27 per cent and 13 per cent, respectively.

Graham-Paige Exports Rise

DETROIT, Oct. 10—Graham-Paige Motors Corp. has reported a sharp increase in foreign shipments during September, registering the largest of any month since July, 1931, and showing an increase of 66 per cent over the preceding month and 63 per cent over September of last year.

British South Africa and Australia both showed important gains. In Europe the increased demand was especially noted in Holland, Switzerland and Sweden.

Canadian Studebaker Sales Show 16½% Gain

WALKERVILLE, ONT., Oct. 10—Although Canadian registrations of all makes of automobiles for 1932 show a decrease of more than 40 per cent as compared to 1931, Studebaker Corp. of Canada, Ltd., shipments show a gain of 16½ per cent as of Sept. 30.

Chevrolet Wins Sixth National Show Drawing

NEW YORK, N. Y., Oct. 10—For the sixth consecutive year the Chevrolet Motor Co. has won first place at the annual automobile shows sponsored by the National Automobile Chamber of Commerce.

This honor, one eagerly sought by the industry, carries with it the right to first choice of exhibition space at the two automobile shows to be sponsored by the N.A.C.C. at New York and Chicago early next year.

Relative positions are awarded by the chamber on the basis of dollar volume of member companies in the 12 months ended June 30. In this period, Chevrolet led all member companies of the N.A.C.C., having built and sold more cars than any other manufacturer in the association.

First place at the N.A.C.C. drawings was taken by Chevrolet originally in 1927 when the company was building a four-cylinder car, and every year since then the award has gone to this largest producing division of General Motors by a constantly widening margin year after year.

Funston Heads Firestone, Ltd.

William H. Funston, Akron, has been appointed president of the Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont.

Mr. Funston, who was previously in the Akron offices as manager of the mechanical goods department, succeeds the late Earl W. BeSaw.

Hadley Returns

Harold Hadley, president, Associated Parts, Inc., manufacturers of Red Head heaters and Ap mufflers, is back at his desk again after an appendicitis operation.

+ + CALENDAR OF COMING EVENTS + +

FOREIGN SHOWS

London, Olympia Show .....Oct. 13-22
Glasgow, Scottish Motor Show..Nov. 11-19
Paris, Aeronautical Show...Nov. 18-Dec. 4

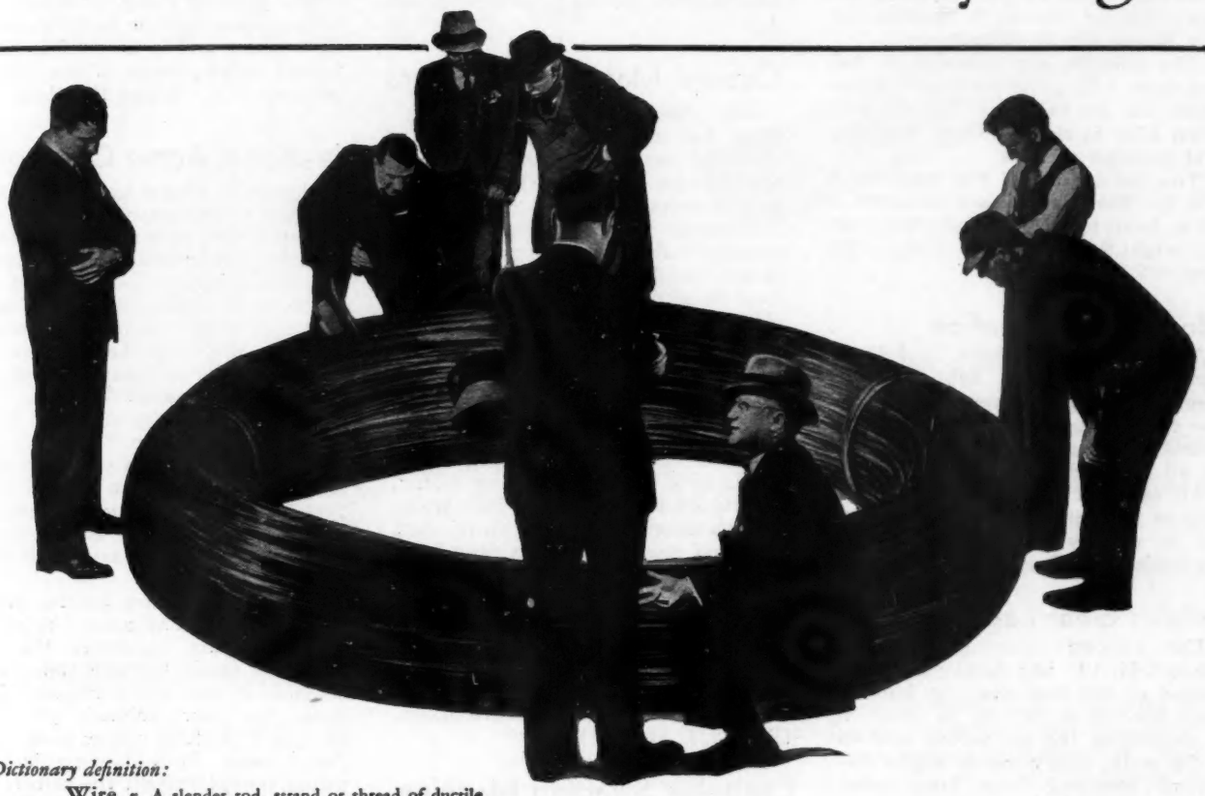
CONVENTIONS

American Gas Association, Atlantic City (Annual) .....Oct. 10-14
Natl. Hardware Assn. (Accessories Branch), Atlantic City, N. J. .....Oct. 17-22
Natl. Tire Dealers Assoc., Atlanta, Ga. .....Nov. 14-16
Natl. Battery Mfg. Assoc. Meeting—Cleveland .....Nov. 17-19
American Society Mechanical Engineers, New York City (Annual Meeting) .....Dec. 5-9
Natl. Exposition of Power & Mechanical Engineering, New York .....Dec. 5-10
Nat'l Automotive Parts Assoc...Dec. 12-14
Annual SAE Dinner—New York Jan. 12, 1933
Highway & Building Congress, Detroit .....Jan. 16-20
American Road Builders' Annual, Detroit .....Jan. 16-20
Steel Founders Soc. of America—Annual Meeting—Detroit...Jan. 16-21
Annual SAE Meeting—Detroit Jan. 23-26, 1933
American Soc. for Testing Materials (Annual Meeting)...June 26-30

SHOWS

Dallas, Tex., State Fair .....Oct. 8-23
Joint M.E.A. & N.S.P.A. Trade Show, Detroit .....Dec. 5-10
National Automobile Show, New York .....Jan. 7-14, 1933
Pacific Automobile Show, San Francisco .....Jan. 7-14
National Automobile Show, Chicago .....Jan. 28-Feb. 4, 1933
Kansas City Automobile .....Feb. 11-18

Wire viewed from every angle



Dictionary definition:

Wire, *n.* A slender rod, strand or thread of ductile metal, usually formed by drawing through dies or holes.

Certainly not the definition that anyone using wire should give. Every manufacturer working wire has requirements, a viewpoint peculiar to his particular product and operation. There is one and only one *best* wire for him. Sometimes he uses it but ofttimes he manufactures as well as he can accepting losses and delays as the natural, unavoidable conditions of his lot in life.

Wissco Engineers have remedied this condition wherever they have found it. They will recommend a kind of Wissco Wire that, because of its characteristics and uniformity, permits the lowest possible manufacturing costs. Wickwire Spencer Steel Company is a dependable source of wire supply. Its products are always true to grade and uniform.

The diagnostic services of Wissco Engineers are yours for the asking. They will gladly view wire from your angle.

•

Wickwire Spencer Steel Company, 41 East 42nd Street, New York City; Buffalo, Chicago, Detroit, Philadelphia, Tulsa, Worcester; Pacific Coast Headquarters: San Francisco; Warehouses: Los Angeles, Portland, Seattle. Export Sales Department: New York City

WISSCO WIRE

by Wickwire Spencer

Wickwire Spencer manufactures High and Low Carbon Wires—in various tempers, grades and finishes—for your specific purpose. Hard-Drawn, soft, or annealed Basic or Bessemer Wires—Hard-Drawn annealed, or oil-tempered Spring Wire, Chrome Vanadium Spring Wires—Valve Spring — Music — Clip — Pin — Hairpin — Hook and Eye — Broom — Stapling — Bookbinding — Machinery Spring Wire — Reed Wire — Clock — Pinion — Needle-Bar — Screw Stock — Armature Binding — Brush — Card — Florist —Mattress—Shaped—Rope—Welding. Flat Wire and Strip Steel, High or Low Carbon—Hard, annealed or tempered—Clock Spring Steel—Corrosion and Heat Resisting Wires. Consult the Wissco technical man on your wire problems, however large or small.

Langelier Finishing Machine

The two-spindle horizontal bench type machine, illustrated, was designed and built by the Langelier Mfg. Co., Providence, R. I., for finishing the lead bushing inserts in molded rubber covers for Ford batteries.

The spindles are mounted on ball bearings and adjustable on centers from 3¼ in. to 6 in. The drive is from a G. E. motor by two Vee-belts and grooved sheaves.

The net weight of the machine is 175 lb. The bench space required is 28 in. front by 12½ in. deep, the overall height being 16 in. (Page 378, Sept. 17.)

Monarch Lubrication

The Monarch Machine Tool Company, Sidney, Ohio, has just announced automatic force feed lubrication for bed, carriage, apron and compound rest as standard equipment on all Monarch lathes.

All parts of the oiling system are built in and concealed. The oil sump can be quickly cleaned of any dirt or sediment. (Page 378, Sept. 17.)

Fellows Gear Lapper

The Fellows Gear Shaper Co., Springfield, Vt., has developed a new method of finishing gears by lapping after hardening, which, in addition to smoothing the contacting profiles of the teeth, also removes slight distortions resulting from heat treatment, thus producing more accurate, efficient, longer-lived, and quieter operating gears.

In practice all gears receive the same amount of lapping; they are then tested on speeders for quietness and bearing, and those which do not pass inspection are set aside and relapped.

In this way gears can be lapped on a production basis at a comparatively low unit cost. (Page 409, Sept 24.)

Krause Boring Machine

Ernst Krause & Co., Germany, introduced a heavy-duty, single spindle, vertical boring machine for finishing cylinder bores.

The chief feature of the arrangement is the use of a single point boring tool tipped with Widia.

This "fine-boring method" is said to have met with success in German and English engine building plants. (Page 410, Sept. 24.)

Excelsior Bumper Polisher

The Excelsior Tool & Machine Co., East St. Louis, Mo., announces the No. 27B Automatic Bumper Polishing Machine for the new type, high-curved and edge-bent bumpers of modern design.

This machine is so designed that the pressure applied to the polishing wheels is equalized by patentable features.

Lateral resiliency of the carriage allows the polishing wheels to follow the contour of bumpers if they are slightly curved edgewise. (Page 442, Oct. 1.)

Osborn Materials Handlers

The Osborn Mfg. Co., Cleveland, Ohio, has added a complete line of overhead materials handling equipment, to be known as Osborn Tramrail Systems.

Products of other divisions of the company are: Foundry molding machines, sand treating and sand and mold handling equipment, and a complete line of industrial brushes. (Page 442, Oct. 1.)

TonWate Swivel Caster

The TonWate caster now being produced by Divine Brothers Co., Utica, N. Y., is of simplified 2-piece design, constructed throughout of heat-treated steel forgings, chrome nickel steel balls and Hyatt roller bearings.

In the TonWate the rigid king pin is replaced by a flexible ball joint, seated on the hardened cup of a Dardelet self-locking safety set screw.

The raceways are held together by the simple method of splitting them vertically, instead of horizontally. (Page 222, Aug. 13.)

Langelier Swaging Machine

A water-jacketed head-swaging machine, constructed with four dies, for reducing valve blanks before upsetting to eliminate turning and its attendant waste of material, has been developed by the Langelier Mfg. Co., Providence, R. I.

To insure sufficient power and easy feeding, compound gears are interposed between the handwheel and pinion shafts. (Page 222, Aug. 13.)

Cincinnati Measurer

A precision measuring device applied to Cincinnati milling machines by the Cincinnati Milling Machine Co., is said to adapt the machine for jig boring and die sinking.

It is also useful for precision-boring small or moderate size lots where it is desirable to hold close limits on spacing between holes, within a very limited range. It is possible to finish-bore holes accurately spaced within one-half thousandth (0.0005) of an inch. (Page 190, Aug 6.)

Worthington Pump Unit

Worthington Pump & Machinery Corp., Harrison, N. J., announced a self-contained automatically primed centrifugal pumping unit comprising an electrically-driven high efficiency ball-bearing centrifugal pump, mounted with its motor, on a fabricated steel bedplate, together with a monobloc priming unit of the wet vacuum type, controlled by an electric pressure switch.

The priming pump, or evacuator, is an adaptation of the well-known "Hytor" pump, and is licensed to Worthington under patents of the Nash Engineering Co. (Page 190, Aug. 6.)

National Acme Chronolog

Numerous efforts have been made in the past to find ways and means of increasing the productive capacity of manufacturing equipment by controlling non-productive or idle time. One of the most interesting moves in this direction is the use of the Chronolog, which is offered to the automotive industry after a long period of development by the National Acme Co., Cleveland, Ohio. It is distributed by the Graybar Electric Co.

The Chronolog is a visual recording machine which may be applied to any type of manufacturing equipment by suitable hook-up. It is mounted on the machine within easy reach of the operator.

From that time on, without further attention, the Chronolog prints at fixed intervals, recording the clock time, the cause for idle time, if the machine is idle, the accumulated idle time, the accumulated production time, and the total pieces produced to that minute. By a simple adjustment within the instrument the printing intervals can be adjusted to 5, 10, 15 or 30 min., to suit the requirements of the work. (Page 427, Oct. 1.)

Zeiss Internal Optimeter

Inside measurements within a range of from ¼ in. to 4 in. in fractions of 0.00005 in. can be obtained with a new adjustable internal attachment which is now available for the Zeiss standard vertical optimeter.

The outstanding features are that the extreme accuracy in measuring within 0.00005 in. is retained, and that the attachment can be adjusted in such a way that bores as small as ¼ in. and as large as 4 in. can be checked with the same equipment.

This attachment, as is the optimeter, is distributed in this country by the George Scherr Co., 128 Lafayette St., New York, agents for Carl Zeiss. (Page 285, Aug. 27.)

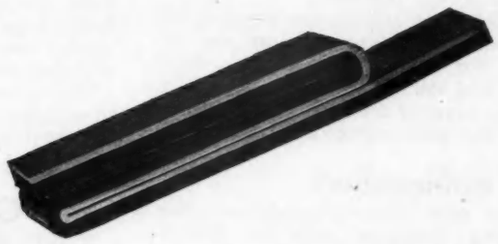
Reed-Prentice Ring Fixture

Reed-Prentice Corp., Worcester, Mass., has developed a universal ring drilling fixture designed for drilling holes on the outside diameter of circular pieces, such as collars, etc.

Holes can be drilled to the center of 6 in. ring and may range from ⅛ to ⅝ in. diameter drill. (Page 399, Sept. 24.)

NOW TURN TO PAGE 514, PLEASE

A New-



BORG-WARNER product

. . . that permanently and economically insures the appearance of bright metal parts of your car against corrosion by weather conditions and road compounds.

—Auto Top Rest and Deck Handle—an example of how Ingersoll Stainless Clad Steels may be used in body trim.

—Artillery Type Wheel formed from Ingersoll Stainless Clad Steel.

The uses of Ingersoll Stainless Clad Steels are many. Consider their advantages in service and economy for instrument panels, running board trim, bumper bars, radiator shells, lamps, tire covers, wheels (both artillery and disc types), etc.

The Borg-Warner Corporation, through its subsidiary, Ingersoll Steel & Disc Company, announces another outstanding contribution to the automotive industry. By the exclusive patented Ingersoll process, we make it economical for you to use Stainless Steels. This new product known as

Ingersoll Stainless Clad Steel

provides an outer surface of genuine stainless steel unaffected by weather conditions or road compounds. It is made by the patented Ingersoll process, whereby an actual ply of stainless steel is WELDED IN THE INGOT to a base of mild or high carbon steel. The finished product has a perfect bond between the two metals which is not affected by manufacturing processes nor by subsequent use.

In addition to the large saving in material cost over solid stainless metals, Ingersoll Stainless Clad Steels may be formed, drawn, welded and fabricated by the same machines now used in your plant for handling deep drawing steels.

Write for details on product in which you are interested

INGERSOLL STEEL & DISC COMPANY

(A Division of Borg-Warner Corporation)

310 South Michigan Ave., Chicago, Illinois

Plants: Chicago, Ill., New Castle, Ind.

Trade Mark Reg.

INGERSOLL

STAINLESS-*Clad*-STEELS

MADE BY THE PATENTED INGERSOLL INGOT PROCESS

E-A Graphic Instruments

A complete line of graphic recording instruments by Esterline-Angus Co., Indianapolis, Ind., has many new and improved features.

A complete assortment of electrical synchronous motor clocks are also offered for driving the charts. Both these and the spring clocks give chart speeds ranging from ¾ in. per hr. to 12 in. per min. (Page 254, Aug. 20.)

Fire Extinguishers

Two new fire extinguishers, the Foamite Crusader and the Childs Model DS, have just been announced by the American-LaFrance and Foamite Corp., Elmira, N. Y. Both are of the 2½-gal. size.

The principal feature is the "Monotype" construction. The entire dome and shell is drawn from a single sheet of special alloy known as Alfronze—which the manufacturer claims is stronger and of higher ductility than copper, and has special corrosion-resisting qualities. (Page 254, Aug. 20.)

B & S Thickness Gages

Brown & Sharpe Mfg. Co., Providence, R. I., recently announced two new thickness gages, Nos. 645 and 647, with tapered blades 3 in. long and ¼ in. wide at the tip.

Both have blade locks, making it possible to clamp any desired blade or blades in position for use. (Page 254, Aug. 20.)

Cleveland Forging Press

A line of all-steel high-speed forging sizing presses has been developed by the Cleveland Punch & Shear Works Co., Cleveland, Ohio, for front axles, differential ring gears, brake drums, wheel flanges, etc. These machines range in size from 200 to 2000 tons pressure, in six models.

The press is equipped with a hand lever for "inching" the head when setting dies and a foot treadle for starting or stopping the slide instantly at any point of its stroke.

The stroke is 12 in., the shut height of die space 29 in. while the bed and ram measure 60 in. from front to back. (Page 160, July 30.)

Jaeger Tachometer

An unusual and compact chronometric type pocket tachometer is being shown to the trade by the Jaeger Watch Co., Inc., of New York.

It is said to be unaffected by magnetic fields, weather or atmospheric variations, and to give instantaneous readings, making it possible to follow all speed variations. (Page 471, Oct. 8.)

Porter-Cable Sander

Automatic sanding of wood or metal strip up to 1 in. thickness is facilitated by the new type BD double belt sander just announced by the Porter-Cable Machine Co., Syracuse, N. Y. It removes scale, burrs and produces a straight grain finish on one side or both.

The operation consists of feeding the work through by means of power feed rollers which give a uniform feed, the sanding being done between two large drive pulleys which are rubber covered to give a cushion to the abrasive belts.

The abrasive belts run in opposite directions, thus neutralizing any motion that might be transmitted by the belt to the work. (Page 254, Aug. 20.)

Tuthill Coolant Pump

Tuthill Pump Co., Chicago, Ill., is now supplying a standard cover, idler pin, idler and rotor (manufactured by mass-production methods) for assembly into the design of the housing most suitable for the purpose.

The machining of the housing or packing box arrangement is simple and can be performed on an engine lathe at a single setting as all bores are circular and concentric.

Under this system, the designing engineer is permitted almost any combination of port arrangements with assurance of a compact pumping unit. (Page 285, Aug. 27.)

United Chromium Unit

United Chromium, Inc., of 51 East 42nd St., New York City, offers a compact chromium plating unit expressly for machine shops.

This new plating unit is so compact that it may be moved right into the tool room, and immediately connected to current, steam, water and waste outlets, and is said to be so simple that it can be successfully operated by almost any workman in the shop. (Page 285, Aug. 27.)

Erie Hammer

A long-standing handicap of the board drop hammer has been overcome by the variable stroke board drop hammer being marketed by the Erie Foundry Co., Erie, Pa.

In this design, the length of the stroke is not adjusted in the conventional manner. Instead, the operator has available either a light or heavy blow, a short or a long stroke, and can choose either at will.

The hammer is treadled in the usual manner with one foot, and the length of the stroke is governed by a very slight rocking of the foot on the treadle. (Page 318, Sept. 3.)

Gisholt Brake Machine

A brake drum machining machine is offered by Gisholt Machine Co., Madison, Wis., for roughing out a front wheel hub and brake drum consisting of a single malleable iron casting.

Replacing the standard Simplimatic traversing platen table is a fixed tailstock housing. This housing carries a boring spindle actuated by a large diameter continuous cylindrical cam and the necessary gearing to complete the feed mechanism.

The use of cemented carbide tools permitting higher cutting speeds and multiple cutter boring heads permitting heavier feeds helps the machine to turn out these drums in a minute and a quarter each floor to floor. (Page 318, Sept. 3.)

Sundstrand Stub Lathe

In line with a policy of constant advance, the Sundstrand Machine Tool Co., Rockford, Ill., has announced important improvements in the 8-in. Stub Lathe. (Page 284, Aug. 27.)

Sundstrand Rigidmil

The Sundstrand Machine Tool Co., Rockford, Ill., 3-B Rigidmil is not only improved but differs in appearance from its predecessors.

Nineteen new features are responsible for this.

Among other things is a more powerful main drive, practically doubled rapid-traverse rates, improved spindle head. (Page 284, Aug. 27.)

Clark Versatile Truck

A lifting, tilting, tiering truck of unusual versatility is offered by the Clark Tructractor Co., Battle Creek, Mich., to those industries in which the economical handling of heavy bales, cases, bundles and crates is a problem.

This truck inserts its long steel fingers under any load that has as much as 2 in. under-clearance, tilts it back a maximum of 20 deg., lifts it, carries it at one to six miles an hour and tilts it forward 7 deg. to tier it safely at a height up to 50 in. (Page 224, Aug. 13.)

Excelsior Stainless Steel Polisher

The Excelsior Tool & Machine Co., East St. Louis, Ill., has placed on the market a special polishing machine (patents pending), designed for polishing large stainless steel sheets and is known as "Excelsior No. 28 Automatic Sheet Polishing Machine."

This is a straight-line continuous polishing machine, polishing any width sheet up to 60 in. inclusive by 144 in. or longer to a commercial finish in one continuous pass under multiple polishing belts.

The endless polishing belts 7 in. wide and 8 ft. in length operate over two end pulleys. The inside pulleys are driven direct from 10-hp. dustproof ball-bearing motors with a specially constructed intermediate idler pulley located between them for the purpose of contacting the polishing belt with the sheet.

The belts are easily reset with the desired grain abrasive from 90 to 400 by the use of a special fixture devised for the purpose, which also reduces the thickness of both edges to avoid feed marks on the polished sheets. (Page 160, July 30.)